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Department of

AGRICULTURE, LABOR AND INDUSTRY

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RELIEF MAP OF MONTANA

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MONTANA

Foundations of Agriculture and of Industry Have Been Laid But Only a Fraction of the Resources Touched—Its Progress Shown Statistically

In this edition of "Montana" an effort has been made to present a picture of the state as it is and of the basic agricultural and industrial resources upon which its future will largely depend. The degree to which development has been carried is touched upon, and the possibilities for further expansion are suggested.

No effort has been made to "sell" Montana in brighter colors than actually exist. Of the immensity and variety of its potential resources, and of their ultimate utilization, there can be no question. When the world will need them, however, and be ready for them under conditions that will insure prosperity to the persons and the capital undertaking their development is beyond the ordinary person to predict. It is with the idea, however, that when the time is ripe, when economic conditions in the nation and the world are favorable, Montana will be ready, that this presentment of its resources is made.

Call is for the Pioneer

While the foundations of agriculture and of industry have been laid in Montana, the state, after all, is still in the pioneer stage of development and its real call today is to the pioneer, as clear as it was fifty years ago in the days of the gold discoveries the Indians, and the trail herds. The nature of the attendant risks has changed, but the need for self reliance, courage and perseverance is as imperative as ever. The nature of the rewards has changed, too; bountiful they are to the successful, but they are not garnered overnight, nor do they involve the element of chance, but long and careful preparation, ample capital or much experience, or more often both, and a vision broad enough to encompass within its reckoning, the reactions and the complexities of the outside world.

There are mountains of good ore in Montana that because of lack of transportation facilities, capital to develop them, or other causes, are not immediately profitable assets to their owners. Likewise, Montana lands include some which, while fertile in themselves, are profitably farmed under existing prices only by the exceptionally efficient operator. In districts that have been settled within the last ten or fifteen years, farming practices first followed are being abandoned in favor of newer methods as out of experience there emerges the systems of farming best suited to soil, moisture and other environmental conditions.

Montana offers some advantages that cannot be duplicated elsewhere. Among others favorable to general farming are low land values combined with relatively high productiveness. There are also factors on the other side, such as distance from price-making markets, lack of centers of large consuming population; and, in many localities, lack of farming experience demonstrating the most efficient methods. In the long view, however, most of the adverse factors will be overcome. Price-making markets and centers of consuming population are being established at closer distances.

The ultimate greatness of Montana is assured, but what the cost to the individual will be depends upon general economic conditions and the fitness of the individual for the struggle. It has been more than some who came in the past could pay, while others, better adapted by temperament and experience, have thrived.

Ultimate Greatness Assured

In agriculture, Montana's future importance depends largely upon non-irrigated farming. In proportion to the total tillable area, the irrigable acreage is small. There are vast areas that will either be farmed under non-irrigated methods, or will revert to pastoral uses. Wheat will probably continue for many years to be the state's chief cash crop, and it is not unreasonable to believe that in a few years Montana will be the leading spring wheat state of the country. With less than a third of its tillable area improved, it now holds second place. But it is also likely that the crop will be produced under a more permanent system of agriculture than the one-crop plan heretofore dominant, and that areas better adapted to livestock grazing than crop production eventually will re-seed themselves to native sod. Evidences exist of the emergence of a more permanent system of agriculture in the non-irrigated as well as the irrigated areas. Corn and cows and chickens and turkeys, beef and milk and eggs are factors of safety that the non-irrigated areas are beginning to find will balance the cash crop of wheat.

An empire is in the making here and Montana has every right to be proud of its attainments, achieved on the development and utilization of only a fraction of its resources. With scarcely a third of its agricultural lands improved, it ranks with other states in total crop value, thirty-first; with a mineral production largely confined to Silver Bow county, except for coal, under normal conditions it has ranked with other states from seventh to eleventh. It is the nation's chief producer of manganese and precious stones, and in 1920 the second leading producer of copper, silver and zinc. It is the largest user per capita of electricity; the possessor of the greatest national parks and the noblest mountain scenery; the holder of ten per cent. of the total water power in the United States; the home of the second largest industrial corporation in America.

An Empire in the Making

Big and prodigal, Montana is scarcely aware of its own strength or of its innate potential greatness. A sparsely-settled land of broad distances and towering mountains, it has seized upon a resource here and there and passed by many another. Its matchless scenery has not been capitalized to any extent in a tourist way. Its irrigation possibilities have just been glimpsed. Even in the dryest year on record, 1919, official stream flow records show enough water flowed out of the state to irrigate ten million acres of land, or five times the area now irrigated. The average flow out of the state is sufficient to cover its 93,000,000 acres with water to a depth of six inches.

Slowly, but surely, not without cost to the individual, Montana is finding itself. It has a place for men and women of pioneer spirit in the development of its agricultural and stock raising opportunities. It has a place for capital in the development of its raw manufacturing and process materials. It welcomes tourists and hunters and fishermen. To all who come it pledges a co-operative hand and a square deal.

The statistical summary appended gives some idea of the state, of its resources and of their development. In all cases the latest official figures available have been used.

STATISTICAL SUMMARY OF MONTANA

MONTANA—Population (1920), 547,593. Population per square mile (1920), 3.8 persons. Area, 94,078,080 acres. Acres unreserved public land (1922), 5,659,879 Acres national forests (1922), 15,933,889. Acres national parks, Indian, military and other reservations (1922), 4,727,894. Average elevation above sea level of state, 3,400 feet; maximum elevation, 12,850 feet; minimum, 1,800 feet. Mean annual temperature of state, 42.3°. Mean annual precipitation, 15.81 inches. Average number of clear days, 163; of partly cloudy, 107.4; of cloudy, 94; of days with .01 of an inch or more of precipitation, 77. Number of counties, 55 Number of incorporated cities, 107; of cities with population of 25,000 or more, 1 · of cities of 10,000 to 25,000 population, 5; of cities of 5,000 to 10,000 population, 6 Principal crops (1922) in order of value: wheat, hay, oats, corn, potatoes, flax. Principal livestock (1922) in order of value; sheep, cattle, horses, swine. Principal minerals in order of value (1920): copper, zinc, coal, silver.

RANKS FIRST AMONG STATES—In spring bread wheat production (39,210,000 bushels, October, 1923, estimate); in percentage of total spring wheat production grading No. 1 (74 per cent. graded No. 1, 1920-1922 inclusive); in lowest average value of good plow lands ($31.00 an acre, 1923) in freedom from cattle tuberculosis (January, 1923), less than nine-tenths of one per cent. of the 205,650 cattle tested reacting to the disease; in production of honey per hive (average of 88 pounds per hive, 1913-1919 inclusive); in use of electricity per capita; in production of manganese and precious stones; in area and variety of National Parks; in acreage of public lands patented (1921).

RANKS SECOND AMONG STATES—In production of copper, silver and zinc (1920); in lowest death rate per 1,000 population (8.2 persons in 1922).

RANKS THIRD AMONG STATES—In area (94,078,080 acres); in extent and size of its coal measures (39,532 square miles containing estimated available supply of 381,000,000,000 tons); in number of cattle tested for tuberculosis.

RANKS FOURTH AMONG STATES—In water power electricity (1923) (average monthly production of 82,000,000 kilowatt hours).

RANKS AMONG STATES—Sixth (1923) in percentage of people owning their own homes (60.5); nineteenth (1922) in value of all livestock, $95,024,000; twenty-fourth (1922) in value of all animal products, $61,300,000; thirty-first (1922) in total crop value; thirty-second (1920) in number of farms; thirty-second (July 1, 1923) in persons per motor vehicle (9.5); thirty-sixth (1920) in population (547,593).

WEALTH—Estimated 1922 crop value, $92,932,090; estimated value of all animal products for 1922, $61,300,000; estimated mineral production 1922, $59,500,000; 1922 lumber cut, 304,377,000 feet; total bank deposits, June 30, 1923, $140,396,521.

TAXATION 1922—Total assessed valuation, $1,471,232,574; total taxable value, $465,200,282; total outstanding county bond indebtedness, $27,866,533; total outstanding county warrant indebtedness $3,308,136; total outstanding school bond indebtedness, $13,092,120; other school debts, $1,021,471; total general and special county taxes, $9,776,328; total general and district school taxes $10,789,777; total municipal taxes, $3,321,006; total state taxes, $2,201,604; total tax (inclusive municipal) per capita, $56.80.

EDUCATIONAL—Number of elementary schools, 3,375; enrollment, 102,484. Number of high schools, 218; enrollment, 18,514.

TRANSPORTATION—Number of railroads, 12; railway mileage, 7,035; main line mileage, 5,072; electric street railways, 7; street railway mileage, 846; total road mileage, 64,732; total improved roads, 29,279 miles; total surfaced and paved, 1,772 miles; total number automobiles (November, 1923), 65,150; total number trucks (November, 1923), 8,300; total number motorcycles (November, 1923), 372. Rural free mail delivery routes, 193; total mileage rural routes, 5,560.

BUSINESS—Number federal personal income tax returns (1921), 36,907, or over 12 per cent. of state's total population engaged in gainful occupations. Total net personal incomes in Montana (1921), $81,527,662; total tax collected, $1,051,863. Number of manufactures (census, 1920), 1,290; average number wage earners, 17,160; value of products, $166,644,518; value added by manufacture, $44,512,594. Number of banks, September 15, 1922, 391—131 national, 260 state, 7 private. Building and loan associations, 181. Moving picture houses, 173. Mercantile census, R. G. Dun & Co., 1922: General stores, 919; groceries and meats, 1,295;

drugs, 311; restaurants and bakeries, 813; garages, autos and accessories, 1,000; lumber, 411; hardware and implements, 378; furniture and undertaking, 199; shoe repairing, 268; blacksmith and machinery, 390; confectionery and cigars, 647; men's furnishings, shoes and tailors, 429; dry goods, milinery and women's wear, 338; billiards, 494; miscellaneous, 2,217. Total assessed valuation 1922 merchandise, $49,160,717. Number grain elevators, 605; total capacity, 17,872,000 bushels. Number creameries, 53. Number flour mills, 66. Number of lawyers, 968. Number of physicians, 538. Developed hydro-electric plant capacity, 296,439 horse power.

AGRICULTURE (1920 census)—Number of farms, 567,677; farm acreage, 35,070,656; improved farm acreage, 11,007,278; irrigable acreage under existing works, 2,753,498; average value all property, per farm, $17,095. Livestock assessed 1922—Number cattle, 1,084,220; number sheep, 1,867,094; number horses, 507,783; number swine (census, 1920), 167,000.

The "Home" Ranch

MONTANA INDUSTRIAL POSSIBILITIES

In Variety, Quantity and Quality of Raw, Process and Fuel Materials, Montana Is Excelled by No State—Trend Toward Decentralization of Production and Rapid Growth of Western Markets Encourage Manufacturing.

A survey of the many tremendous resources of Montana, which are adapted above those of most states to industrial blending, impels the conclusion that with the growing expansion of the oriental markets and the upbuilding of the Pacific coast, the time is not distant when Montana will be an industrial center of the first magnitude. The western and oriental markets will be big enough to absorb products manufactured in Montana from Montana materials sooner than is generally realized. One-fifth of the total exports of this country in 1922 were to the orient. California and Washington competed to an appreciable extent for the first time in 1922 with Chicago for Montana livestock. Coast competition with Minneapolis for Montana wheat for the first time was generally felt in 1922.

In Exploitative or Primary Stage

Industry in Montana is still almost wholly in the primary stage. For the most part, a few of the state's resources have been exploited for the extraction of raw materials that have been transported long distances, there to be converted into manufactured products. There has been some secondary industrial development in Montana, such as plants for making grain into flour and cereal stuffs, lumber into mill products, livestock into meat products, milk and cream into butter and cheese, beets into sugar, gypsum and limestone into cement and plaster, clay into brick, tile and pipe, copper ore into copper rods and wire, and crops of orchards and farms into canned products of commerce. But many other primary resources of the state have been ignored, and practically no attention has been given innumerable other resources of chief importance to secondary industries in the fabrication of raw materials.

The dominant fact about Montana is that it is not a single-industry, but a potentially multiple-industry state. Many states have large agricultural areas, many have coal and water-power, many have lumber, oil, copper, iron, gold, silver and zinc and a score of non-metal minerals, that are essential to industry, but in the variety, quantity and quality of these resources no state excels and few possess what Montana has.

Vast Multiple Industry Resources

Consider the significance to Montana's industrial future of these facts: One-tenth of the potential minimum water-power of the United States is in Montana; its coal fields, covering 39,532 square miles with an estimated available supply of 381 billion tons, are exceeded by those of only two other states, the coal of which is of lower grade; its natural gas fields constitute one of the largest reserves of this resource in the United States; its rapidly-growing petroleum production seems destined to place it among the leaders; in silver, manganese and precious stones it stands first; in copper and zinc third. Its manganese ores are the largest known reserves in the country. Its phosphate belongs to an inter-

mountain deposit that is the largest known in the world. Its soft wood saw timbers belong to the only great body of such timber remaining in this country, which is one of the three great bodies left in the world.

In addition to these resources which are more or less generally known, Montana has many other resources of which few persons are aware. Big iron deposits are one. It has big possibilities of finding still other resources. Illustrative of this, the fact that Montana possessed important manganese deposits was not dreamed of until 1917. Its phosphate deposits were accidentally discovered while geologists were engaged on entirely differentt work. A valuable clay deposit in Sheridan county was discovered in like manner. Among its chromite deposists is one bed 27 miles in length, which probably is the largest in the United States, but less than four miles of it has been more than cursorily examined. In the 1916 reports of the United States Geological Survey there was no mention of either chromite or manganese in Montana. The existence on a considerable scale of many other resources of much value to industry is reported but there has been no thorough investigation. A summary of the occurrence of known and reported natural resources of Montana will be found in the appendix.

Drift Toward Decentralization

Many economic forces that caused the centralization of manufacturing in the Atlantic coast states are either no longer potent or have been carried to such an extreme as to set adverse influences at work, so that tendencies at present point to a decentralization. An example of the first-named cause is a more stringent immigration law, which has restricted the hitherto abundant supply of cheap labor, and is inducing many manufacturers to look to other parts of the country in the expectation that the more healthful atmosphere and the higher types of available workers, as to natural characteristics, will more than offset the handicaps incident to a new location. An example of the last-named cause is seen in the fact that production has so far exceeded the absorbing power of the region that transportation has broken down under the double burden of outgoing manufactured products and incoming raw materials and foodstuffs. The center of population has steadily moved westward. As production has increased, raw materials near at hand have been depleted. Increased production has meant more workers and a food supply from a larger area. These three factors have made for hauls that have steadily lengthened and for mounting transportation costs. The advantages of the original locations, in many instances, are no longer commensurate with the disadvantages new conditions have interposed. Farsighted manufacturers and financiers have begun to realize that this economic structure has aggravated the development of single industry communities with an attendant chain of physical, social and other evils. Much class hostility and friction between industrial and agrarian interests is ascribed to this development.

Because of many influences, only a few of which have been touched upon, there is a distinct trend at present toward the decentralization of production (not of large scale control) and the upbuilding of multiple industry communities. This new development will be controlled in location by the types of manufacturing enterprises, which some economists classify in three groups. The most important are those which are located with direct reference to the source of raw and process materials, and in a second group those which follow the market by reason of relative or actual high cost of transportation of the finished product, or because of some other factor making marketing more convenient from a local source. In a lesser third group are placed enterprises largely dependent upon the initiative and energy in the persons who have the desire or special aptitude for

A Potential Power Site

their development. As a rule, the products of this third group, it is said, bear about the same transportation charges as do the raw materials, so that the location of the plants becomes immaterial.

Factors That Control Location

Factories using bulky, cheap, fragile or perishable materials are chiefly of the first type and usually found in districts where the materials exist. Some examples are wood pulp mills, brick plants, starch factories, creameries, sugar beet factories, canning factories, and coarser grades of wooden products. Factories whose finished products are bulky, cheap, fragile, perishable or in quick demand by users or which have more value in skilled labor than in raw material are principally of the second group and follow the market. Examples are farm implements, glassware, potteries, work-clothing, furniture, and machine manufacturing industries which are always near the machine-using industries.

In many industries there are also special influences that are factors in location. The element of fuel is of great importance to the Portland cement, the pottery and the glassware industries. Cement is bulky and cheap, pottery and glassware are fragile, so nearness to market as well as availability of fuel is of prime importance. While nearness to market and availability of raw materils are big factors in the location of iron and steel plants, the determining factor has largely been the right kind of fuel for smelting. The fragility of coke, it is asserted, prevents its shipment for distances beyond six hundred miles, and, because the highest known grades of coking coal are found near Pittsburgh that city has retained its supremacy in the manufacture of iron and steel. Climate, it is claimed, is the controlling factor in the location of woolen mills. A humid atmosphere is necessary to keep the fibers soft and pliable and so permit drawing into the finer grades of yarn or thread. This atmosphere can be artificially created in Montana, which is one the chief producers of wool, but as it is found naturally where the mills are now located, and is also found on

the Pacific coast, should there be a shift of mill location because of a big western and oriental market, it would more likely to be the coast than to centers of raw wool production, except for the coarser woolen goods.

In many important manufacturing enterprises, skilled labor localized in certain communities prevents their decentralization. Sanitary pottery, for instance, is entirely the work of skilled hands, and is localized exclusively in two eastern cities. Electrical porcelain potteries, on the other hand, are largely made by machines manned by semi-skilled labor, and are manufactured in a score of scattered places. Though efforts are being made to standardize leather, lasts, methods and internal factory transportation, the locale of shoe manufacturing is still largely dominated by the domicile of skilled labor. The influence of skilled labor, however, in determining factory locations, is rapidly waning. Transference of skill to perfected machines, the sub-division of labor with specalizaton upon simplified tasks is shifting the emphasis from skilled to unskilled or semi-skilled labor. This labor is mobile and seeks the factory. Examples of this in Montana are found in the copper rod, wire and cable plant of the Anaconda Copper Mining Company at Great Falls, and in the sugar-beet factory at Billings.

New processes, in many instances, are overcoming the special influences that have confined industries to certain localities. Perhaps the most notable illustrations, and those which bode the most good to an industrial future for Montana, have to do with sources of fuel and power. In the iron and steel industry, Pittsburgh's virtual monopoly of the best coke has been overcome by the invention of ovens that take ordinary grades of coal and, by saving the by-products, turn out a good quality coke at a moderate price. The electric furnace is growing in favor for smelting. The United States Geological Survey predicts that "the present geographic distribution of the centers of production of pig iron may be modified by the increasing use of electric smelting and by the discovery of processes for making metallurgic coke from coals that have not heretofore been classed as coking coals." This prediction may be realized in an invention by a Montana man, who has been granted patent rights on an electric furnace, which it is claimed will overcome the lack of suitable coke for the reduction of the big deposits of Montana iron ore.

Fuel and Power Are Big Assets

A ton of coke is required for the production of one ton of pig iron. Coke suitable for iron manufacture costs $15 a ton in Montana against $3.00 in Ohio, thus penalizing iron production in Montana $12 a ton. The basis of the patent is a process by which the fuel is kept entirely separate from the ore, preventing contact of impurities with the molten iron. Further, this new furnace consumes only one-tenth as much electricity in producing a ton of pig iron as do the electric furnaces that have been perfected in Norway and Sweden. The inventor believes his furnace is capable of development to a point that will make possible the manufacture of iron and steel in Montana to supply the markets mid-distant to the eastern steel plants.

Use of the electric furnace is growing in other branches of the iron and steel industry, in making ferromanganese and spiegeleisen, the former being an alloy largely used in open-hearth steel from which structural shapes, sheets, bars and wire are made, and the latter an alloy in Bessemer steel from which rails, forgings, etc., are made. The Geological Survey states that "the metallurgy of chromite has apparently been so developed in the hydro-electric process as to utilize to advantage relatively low-grade ores such as are most abundant in the United States . . . . and the further development of that process would greatly diminish the handicap of long transportation." Chromite and manganese, next to iron, are the most important resources Montana has for an iron and steel industry.

There is every reason to believe that Montana's wealth of basic industrial materials combined with its vast fuel and power resources and the growing importance of the western and oriental markets will bring manufacturing here. According to experts, the prairie lignite of eastern Montana, if made into producer gas and the energy is then changed into electricity, is equal in energy value at $5.00 a ton to Pittsburgh bituminous coal at $10.20 a ton.

A Forecast of Industrial Development

The emergence of industry in Montana from the extractive to the manufacturing stage, however, will not be a sudden transition but a slow growth along two lines. One will be a more complete fabrication for sale in western and oriental markets of the raw materials now produced in large quantity. The other will be a development of industries, utilizing resources of Montana, that in the beginning at least will primarily manufacture tools and appliances required by the extractive and other industries already established. The copper, rod and wire mill at Great Falls is an instance of the industrial transition along the first line; the manufacture of some mining machinery, such as hoists and ore cars in the mining districts, and the assembling and partial fabrication of oil-drilling equipment by machine shops in the oil fields, are instances of the second line of development to be anticipated. In other words, the development will be in accord with the axiom that nearness to market is the most important of location considerations to the largest number of manufacturing enterprises.

There are some real opportunities for new manufacturing plants in Montana to supply the needs of the present available markets. Looking at the matter from the angle of the needs of extractive industries already established and the possibility of filling these needs with products made out of Montana resources, the prediction would appear justified that the next step forward in this state will be the establishment of iron and steel mills, and then of paper mills.

The coal, metal mines and smelters use large quantities of iron and steel products. The northwestern oil fields are big users of pipe and steel tanks. The building and other miscellaneous industries are users of iron and steel products. The farms of the northwest require barb and woven wire fencing. Establishment of iron and steel works in the state would make possible the establishment of many specialized plants serving markets now available for such products as gas engines for farm use, wind mills, pumps, certain kinds of farm machinery, tin cans for the northwestern and intermountain canneries, and a large variety of pressed metal goods—buckets, cups, dishes and novelty goods, hardware of various sorts and speciality goods.

Oil Refining the Newest Industry

It is likely that the first step looking to an iron and steel industry in Montana will be a plant doing machine work and making steel castings from scrap steel in an electric furnace. Scrap iron from the agricultural and mining regions is comparatively abundant and is of the highest grade for reworking. There is no plant in the northwest utilizing the scrap, although the market is large for steel castings. It is asserted the differential in transportation costs in favor of such a home plant would insure its success against present holders of the market. In California there are over sixty such steel foundaries. At present steel castings must come from either Minneapolis or Salt Lake. The demand from such a plant consists of steel castings for mining and smelting machinery, railroad equipment, oil-field equipment and many small repair parts for tractors and farm machinery.

An Iron and Steel Industry

A plant turning out bearing metals, of which large quantities are used by extractive industries already established in the northwest, would logically seem to follow, especially in view of the fact that Montana is one of the largest producers of the metals in such alloys.

In the resources required and the market available Montana seems well adapted to the manufacture of certain kinds of paper. To be successful, however, the manufacturing processes probably would have to be carried to the point of making the product ready for immediate use, and not selling it to distant paper-goods plants, otherwise the marketing advantage gained from location would be lost. The available demand is in the intermountain states for newsprint from newspaper publishers, egg-case fillers from poultry farms, ice cream cartons, butter packages, wrapping paper, etc. This market is now supplied from eastern or Pacific Coast points.

Adapted to Paper Manufacture

In the manufacture of all grades of paper except the heavy board suitable for packing, egg-fillers, etc., several basic materials besides straw are essential. The straw fiber is short, giving a soft paper with little tensile strength. For tougher paper essential for most purposes, wool pulp is mixed with the straw. Corrugated board, for instance, for making heavy packing boxes, utilizes strawboard for the inner corrugated layer that gives resistance to crushing loads, but requires a strong thin paper made of better material for the outer sheets. Ice cream cartons, butter packages and Christmas boxes are made from chip-board which is sometimes obtained by working old paper and cotton waste into the stiff board used in making ordinary boxes.

Both the raw and process materials required for paper are found in Montana—wood pulp from western Montana, straw from the agricultural districts, coal and limestone from a score of counties, sulphuric acid from the smelters. Gypsum, used as a filler, is found in seven counties. Bentonite, used as sizing, is reported from one county, and barite, used in the same way, is found in four counties. In one district alone, on the West Fork of the Flathead river, the United States Forest Service estimates there are 400,000,000 to 500,000,000 feet of spruce, white fir, balsam and lodge pole pine suitable for the making of pulp.

Enough has been said to indicate some of the problems and possibilities involved in bringing manufacturing to Montana. The first essential in any contemplated industrial program will be a detailed and comprehensive survey of the raw and process resources of Montana, not alone of their location, but of their properties, chemical and physical and also of their quantities. Once this information is assembled, a manufacturer can be specifically advised of where and in what amount the materials required by his industry are to be

An Economic Survey Is Essential

Developing the Mineral Wealth

had. Climatic and atmospheric conditions and the constituents of the various water supplies are important process materials to some industries.

Missoula is the first, and, so far as known, the only community in the state to undertake a scientific industrial survey. The work was begun in the summer of 1923 to ascertain what industries are best adapted to the natural resources of the region and the present and potential markets.

An instance of the conversion of a practically waste product into processing articles of high commercial value is found at Eureka, Lincoln county, where the International Chemical Products Company has erected a plant for the extraction of mucic acid or cream of milk sugar and other by-products from the butts of tamarack trees. Cut-over lands are being cleared of stumps as a result of the operations of the company, the butts containing a higher mucic acid content than other parts of the tree. Mucic acid is a product of the sugar galactose, one of the chief constituents of milk sugar, and is extracted by the company from the plant fibres in its complex form, hydrolized and then oxidized to form the acid derivative, mucic acid. It is obtained free of impurities and has a wide field of usage in various foodstuffs, soft drinks, jellies and medicine, and also in the mordanting of cloth. The largest demand, however, is in the baking powder trade, either in the form of a straight baking acid for use in the manufacture of flour or in the form of baking powder for direct use. It possesses twice the strength of cream of tartar and will keep indefinitely, two properties that have given it a demand that has necessitated enlargement of the plant. Several by-products are also recovered, one being oxalic acid, which is obtained in an almost pure state. Tests have shown the wood fibre refuse to be excellent for newsprint paper and it is contemplated to use it later for wood pulp.

Besides the materials required in the iron and steel and the paper making industries, Montana has the resources needed in many other industries. Among others are the following:

Electrical Materials and Appliances

Montana is the third largest producer in the United States of copper, the third largest producer of zinc and has large deposits of phosphate, derivatives of which are used in making phosphor bronze and phosphor copper. Copper is indispensable to the electrical industry and most of the output is used in that industry. The North Pacific district, which includes western Montana, is pronounced by the United States Geological Survey, "the richest in potential power in North America." The developed power of the area is 750,000 horsepower and the potential power 11,000,000 horsepower. It is reasonable to assume this district in time will be the heaviest user of copper. Montana is in a position to furnish it. Silver Bow county is the principal producer of both copper and zinc, although eighteen other counties have also produced copper, and nine other counties zinc.

Many other materials used in the electrical industry are included among Montana's resources, such as graphite in Madison county, cadmium and bismuth in Silver Bow county, mica in Madison county, asbestos in Gallatin and Madison counties, slate for switchboards in Lewis and Clark county, glass sands and pottery clays for insulators and insulating materials in a number of counties, timber for pole transmission lines in western Montana counties, sapphires for jewel bearings in meters and other electrical equipment in Granite county.

Glass and Pottery

Practically all the basic materials required for glass and pottery occur in this state in abundance, in close proximity to cheap fuel and power. Most of the sand used in glass making occurs as sandstone, quarried in blocks and must be crushed and prepared for use. It should be friable or easily crushed. Sandstone is one of the most abundant rocks found in the state, and particularly in those districts where natural gas has been developed. No detailed study has been made, but investigations have been carried far enough to show there are ample supplies of glass sand in Montana. More than half the domestic output of arsenic is used in an oxide form by the glass industry as a decarbonizer. Silver Bow and Park counties are big producers of this metal. Manganese is the chief decolorizer in the glass industry. Granite and Silver Bow counties have the largest reserves in the United States of manganese ores. Lead in the form of oxides is also extensively used in glass making. It is produced in 18 counties. More than half the counties in Montana have limestone deposits many of which will meet the requirements of the glass industry—free from clay, iron pyrites and carbonates of iron and magnesia. It is believed that many more deposits of fire clay will be discovered in Montana besides those already known. There are two

The Largest Smelter in the World

Much Logging in Western Montana

deposits of fire clay in Lewis and Clark county, two in Cascade, several in Flathead and one each in Powell and Jefferson counties. For glass making purposes clay must be free from lime and sulphides of iron and contain as little oxide of iron as possible.

Besides extensive deposits of clay suitable for making common brick, there are many deposits of pottery clay in Montana, suitable for pressed brick, tile and pipe, flower pots, some of which burn into a hard, durable ware and take an excellent glaze. Pottery clay beds are found in Powell, Missoula, Sanders, Flathead, Ravalli, Gallatin, Sheridan, Carbon and Fergus counties. There are fourteen brick and clay working establishments in the state that turn out $500,000 worth of products a year. Several of the plants manufacture silica fire brick, and one plant in Silver Bow also manufactures refractories, such as crucibles, cupels, scorifiers and other assay goods.

Kaolin, extensively used in the manufacture of porcelain, is reported in Fallon county.

Natural gas, which is preferred above all other fuels in glass making, has been developed in large quantities in several counties and is piped from the Elk Basin field to Billings, Yellowstone county.

Insecticides and Fungicides

Arsenic produced in Silver Bow and Park counties. Sulphur from the smelters. Gypsum, used as a base, found in Cascade, Fergus, Jefferson, Carbon, Big Horn, Madison and Park counties.

Paint

Lead produced in 18 counties. Zinc in 10 counties. Flax, for linseed oil, grown in 40 counties of the state. Gypsum, used as a base, found in Cascade, Fergus, Jefferson, Carbon, Big Horn, Madison and Park counties. Barite, used as pigment in white enamel paint, found in Missoula, Madison, Carter and Wibaux counties. Also reported in Judith Basin county. Clay, "mineral paint," reported in Granite county.

Fertilizers

Phosphate found in Granite, Powell, Lewis and Clark, Beaverhead and Jefferson counties. Sulphuric acid from smelters. Nitrate found in Madison county (value of deposit not determined). Oil shale suitable for tetraphosphate found in Beaverhead county. Gypsum found in seven counties. The Anaconda Copper Mining Company is operating a large super-phosphate plant at Anaconda.

Tanning

Hides from packing plants at Butte, Great Falls and Billings and from many independent slaughterers. Sulphuric acid from smelters. Arsenic found in Silver Bow and Park counties. Chromite, derivatives of which are used in making chrome leather, found in Stillwater, Sweet Grass and Carbon counties. Bark of spruce, larch and pine, among other barks used in tanning, available in western Montana counties. Barite found in Missoula, Madison, Carter and Wibaux counties.

Census of Manufacture

There are 1,290 manufacturing establishments in Montana, according to the Bureau of the Census. In 1919 these plants employed 17,160 wage-earners and turned out products valued at $166,665,000, of which $44,513,000 was the value added by manufacture. Incidentally, the second largest industrial corporation in the United States, the Anaconda Copper Mining Company, exceeded in size only by the United States Steel Company, has its home office in this state. Its holdings in Montana are larger than in any other state or country in which it operates.

Smelting and refining of copper, zinc and lead is the principal industry, but figures on its operation are not available, being grouped by the census report in "all other industries." Milling of flour, in value of products, comes next, and then lumber and timber products. The following table shows the manufacturing plants in Montana by industries, the average number of wage-earners and the value of the products as reported by the Bureau of Census:

Name of Industry—	Number of Establishments	Number of Wage-Earners	Value of Products
Flour mills	69	360	$16,386,000
Lumber and timber	153	3,693	10,992,000
Car and shop construction and repairs	30	5,312	10,957,000
Slaughtering and meat packing	12	210	6,859,000
Butter	47	190	4,219,000
Printing and publishing, newspapers and periodicals	225	829	3,913,000
Bread and other bakery products	119	384	3,124,000
Automobile repairing	255	520	2,039,000
Foundry and machine-shop products	22	359	1,495,000
Lumber, planing-mill products, not including planing mills connected with sawmills	30	176	1,205,000
Printing and publishing, book and job	22	182	850,000
Confectionery and ice cream	37	134	810,000
Copper, tin, and sheet-iron work	34	70	565,000
Brick	14	145	505,000
Gas, illuminating and heating	6	63	487,000
Mineral and carbonated waters	31	48	377,000
Liquors, cereal beverages	7	46	355,000
Saddlery and harness	11	36	319,000
All other industries	166	4,403	101,208,000

FARMING AND STOCK RAISING

Montana's Competitive Advantages—Experience and Capital Required—Land Value Aids—Marketing Facilities—Farm Organizations.

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Montana's greatest competitive advantage that overcomes the handicap of distance to price-regulating markets is low land valuation combined with relatively high productivity. Raw land and improved farms can be bought in Montana today at below pre-war figures. The depression that overtook agriculture generally in 1920 and the years after did not spare Montana. It followed immediately after some years that had been unusually trying upon the men and women who were establishing homes in the West. These circumstances enabled Montana to escape inflation of land values that is now taking toll from older and more completely developed agricultural regions. They have caused to be thrown on the market newly settled and partially improved land at extremely attractive prices. On irrigated as well as non-irrigated farms, this is now a time of favorable opportunity for land ownership and operation in Montana by the right men and women, adaptable to conditions, and with experience and capital requisite to success in any land.

Experience and Capital

There can be no hard and fast rule as to the experience and capital required for a successful start in farming in Montana. The history of the agricultural development of this state, in common with that of all other districts through the early stages, shows that Montana would have been a great deal better off had all who came been possessed of sufficient means for a comfortable start, and experience in farming to guide and warn them. While thousands have made good without either capital or experience, settlement of land by others similarly situated is not recommended. Safe farming must be based upon reserves that support during crop or market adversity, and there is certainly no less need for such a reserve at the outset of farming than later.

There is a general recognition in Montana of the suitability of the long-time amortization payment plan to help the buyer through from land purchase to complete ownership. The State of Montana took the lead in fixing this principle in the state land policy by adopting laws, providing amortization payment by purchasers of state land, with 15 per cent paid in cash and the balance extended over 35 years with interest at five per cent and practically the same terms for repaying state farm loans. Montana is situated in the Twelfth Federal Land Bank district, and the federal farm loans have been a powerful factor in regulating long-time land credits. Since the creation of this bank there have been formed in Montana 150 national farm loan associations through which $17,000,000 has been loaned on farm mortgages to farmers.

It is the policy of the divisions and departments of the State of Montana that have to do with land policies to advise and guide incoming settlers as far as possible to the end that they may establish themselves under conditions that afford the best possible opportunity to make good. In particular, these state

agencies are the state department of agriculture, the state agricultural college, and the state land board.

Marketing the Crop

Marketing facilities and advantages in Montana are certain to enjoy relatively rapid expansion owing to the advantageous availability of the state to both eastern and western markets. Competitive factors from the great markets of the central states and from the increasing buying and manufacturing markets of the Pacific coast, meet in Montana, and the future result has immense economic significance to farmers in this state. Co-operative marketing by farmers has been developing for years, chiefly among producers of grain, livestock, wool and cream.

Wheat is Montana's chief export grain crop, and until the last few years practically all that moved beyond the state boundary went to Minneapolis and Duluth. The growth of western markets has been rapid, however, and they are steadily absorbing a larger proportion of Montana's wheat crop. There are 700 grain elevators serving all farm districts in Montana, about ten per cent of which are co-operatively owned and managed by farmers. The most important present movement toward co-operative marketing of wheat is in the Montana Wheat Growers' Association, with over six thousand members, which handled through a growers' pool over five million bushels of wheat of the 1922 crop.

Marketing livestock from Montana has established well-grooved and efficient channels. Operating co-operatively through a state department, cattle-growers maintain inspectors at all the markets to which Montana ships for the purpose of protecting the property rights of owners beyond the state borders. Co-operative livestock shipping associations to accommodate the owner of small lots of stock are developing all over Montana with signal success.

There are 60 creameries, many of them co-operative, and well-organized cream shipping facilities for marketing cream, and the pull for surplus butterfat from both east and west reaches well into Montana and quickens market conditions over a considerable part of the state.

The market seeks the grower of Montana wool, but co-operative sale through a growers' pool is rapidly approaching domination of the state's big clip. Of the 1922 crop, three million pounds, or over 15 per cent of the total, were sold through the pools of the Montana Woolgrowers' Association; of the 1923 clip, indications point to 45 per cent to be handled through the association pool.

In addition to the developing western markets there are other economic and marketing advantages offered by Montana that are certain to react favorably on her agriculture. Low production costs because of high yields combined with low land values constitute the initial step toward successful marketing. Cheap production is over half of marketing. There are special markets near at hand now drawing supplies from points much farther away than Montana, as for illustration, literally hundreds of thousands of fat hogs are shipped through the state from Nebraska, Iowa and South Dakota to supply the demand of the packers of the Pacific northwest. The natural trend is toward the production of commodities of which marketing costs, including transportation, take the least possible share out of final selling values.

Farm Organizations

There are over twenty farmers' organizations of special or general character in Montana, and comers will find it easy to re-establish old connections in their new home. Thirty-five counties, or all but five or six of the agricultural units of Montana, have county farm bureaus, which are federated into the Montana State Farm Bureau. The Montana division of the Farmers' Educational & Co-Operative Union has active units in ten counties, and is strongly intrenched in six counties

in southern Montana. The Grange and Equity have active locals. The Montana Stockgrowers' Association is the big parent livestock organization, but there are active associations whose membership comprises breeders of purebred livestock of all the leading breeds. Special organizations are functioning for fruitgrowers, poultrymen, dairymen, bee-keepers, and other groups that play important parts in farm development in Montana. All these organizations are in close co-operation with the Montana State College of Agriculture at Bozeman, the state department of agriculture, and the state livestock commission and sanitary board at Helena.

High Average Yields on Low Priced Lands

One of the factors in successful farming, according to the economists, is a good average yield per acre. Montana's high average crop yield and the low average value of its good plow lands, in comparison with the leading agricultural states of the middle west, are important factors to be considered by the man seeking a farm location.

Over a period of 16 years, the average yield per acre on nine staple farm crops was larger on the average farm in Montana than it was on the average farm in the big agricultural states of the middle west. The figures used in this comparison are those of the United States Department of Agriculture.

Comparing the average yields per acre from 1907 to 1922, inclusive, of Montana with North Dakota, South Dakota, Minnesota, Iowa, Nebraska, Wisconsin, Illinois, Missouri, Kansas, Indiana, and the average for the United States as a whole, Montana ranked first on oats, hay and potatoes, second on winter wheat and spring wheat, third on barley and rye, seventh on flax, and eleventh on corn. Corn, it should be remembered, is a new crop in Montana and farmers are just beginning to understand how to grow it and to find the varieties best adapted to the state.

Crop Quality Comparisons

The only comparisons available on crop quality are in wheat and potatoes. Over the three-year period of 1920-1922, inclusive, 74.4 per cent of Montana's spring wheat graded No. 1 . Wyoming ranked second with 59.4 per cent grading No. 1. The average for the United States was 33.4 per cent. Of the states lying east of Montana, North Dakota ranked seventh, with 33 per cent of its crop grading No. 1; South Dakota ranked ninth with 23.3 per cent; Minnesota tenth with 20.6 per cent; Nebraska twelfth with 9.5 per cent; Wisconsin thirteenth with 8.2 per cent and Iowa fourteenth with 7.2 per cent of its spring wheat grading No. 1.

The quality comparison on potatoes was made by the Louisiana Experiment Station in 1923 when it secured 30 lots of Bliss Triumph seed from Montana, Wisconsin, North Dakota, Nebraska and Louisiana. There were eight lots from Montana, each raised by a different grower, and the average of the eight lots produced 192.2 bushels per acre. The average of the Wisconsin lots yielded at the rate of 166.5 bushels, of the North Dakota lots at the rate of 161.8 bushels, of the Nebraska lots at the rate of 150.1 bushels and of the Louisiana lots, which were bought on the open market, at the rate of 103.6 bushels per acre.

The relative position in average yield per acre, for the last 16 years, of Montana, Iowa, Nebraska, Wisconsin, Illinois, Kansas, Missouri and Indiana in the production of corn, winter wheat, spring wheat, oats, barley, flax, rye, hay and potatoes, and the average value of good plow lands, based upon figures of the United States Department of Agriculture, are shown in the following table:

LAND VALUES AND CROP YIELDS

State	Value good plow lands 1922	How the states rank in per acre yield on 9 staple crops over 16-year period (1907-1922 Inc.). First on	Second on	Third on	Fourth on	Fifth on	Sixth on	Seventh or lower on
Montana	$ 31.00	3 Crops	2 crops	2 crops	.....	.....	.....	2 crops
Iowa	181.00	2 "	2 "	2 "	1 crop	.....	.....	2 "
Nebraska	116.00	.....	.....	1 "	.....	1 crop	.....	6 "
Wisconsin	108.00	1 "	4 "	2 "	1 "	1 "	.....	.....
Illinois	155.00	2 "	.....	.....	4 "	.....	.....	2 "
Kansas	74.00	....	1 "	.....	.....	.....	.....	8 "
Missouri	85.00	.. ..	.....	.....	.....	.....	1 crop	8 "
Indiana	105.00	.....	.....	1 "	1 "	1 "	1 "	4 "
United States	84.75	....	.....	.....	.....	.....	.....	.....

AVERAGE YIELDS PER ACRE

Average yields per acre of 16 years, 1907 to 1922, inclusive. Based upon figures in the 1916 and 1921 Yearbooks of the United States Department of Agriculture and for 1922 upon those given in Vol. 2, No. 26 (December 23, 1922) of Weather, Crops and Markets.

Corn, Bushels		Winter Wheat, Bushels		Spring Wheat, Bushels	
Iowa	36.9	Iowa	20.5	Illinois	18.6
Wisconsin	36.5	Montana	20.1	Montana	18.5
Indiana	36.4	Wisconsin	19.8	Wisconsin	17.1
Illinois	34.4	Illinois	17.7	Iowa	15.0
Minnesota	34.0	Minnesota	17.3	Indiana	14.5
South Dakota	20.4	Nebraska	16.6	Minnesota	13.5
United States	26.2	Indiana	15.5	United States	12.7
Missouri	26.7	South Dakota	15.3	Nebraska	12.4
Nebraska	24.9	United States	15.3	Missouri	11.9
North Dakota	23.6	Kansas	13.6	South Dakota	11.4
Montana	22.2	Missouri	13.6	Kansas	9.4
Kansas	17.9				

Oats, Bushels		Barley, Bushels		Flax, Bushels	
Montana	36.2	Illinois	28.9	Wisconsin	12.5
Wisconsin	35.4	Wisconsin	28.8	Iowa	10.7
Iowa	34.6	Montana	27.5	Minnesota	9.4
Illinois	34.5	Iowa	27.5	South Dakota	8.3
Minnesota	31.9	Indiana	25.7	Nebraska	8.1
Indiana	31.1	United States	24.7	United States	7.8
United States	30.5	Missouri	24.2	Montana	7.7
South Dakota	28.6	Minnesota	24.1	North Dakota	7.5
Nebraska	27.3	Nebraska	22.3	Missouri	7.1
Kansas	24.9	South Dakota	22.3	Kansas	6.4
North Dakota	24.8	North Dakota	19.1		
Missouri	24.7	Kansas	17.6		

Rye, Bushels		Hay, Tons		Potatoes, Bushels	
Minnesota	18.4	Montana	1.73	Montana	131.5
Iowa	18.1	Kansas	1.61	Wisconsin	99.2
Montana	17.7	Nebraska	1.60	Minnesota	97.6
Wisconsin	16.9	Minnesota	1.58	United States	96.7
Illinois	16.9	Wisconsin	1.54	North Dakota	88.8
South Dakota	16.3	South Dakota	1.46	South Dakota	80.9
United States	15.4	United States	1.44	Iowa	77.9
Nebraska	15.1	Iowa	1.41	Nebraska	76.0
Indiana	14.9	Indiana	1.29	Indiana	75.4
Kansas	13.8	Illinois	1.27	Illinois	71.5
North Dakota	13.7	Missouri	1.15	Missouri	69.3
Missouri	13.5	North Dakota	1.12	Kansas	65.0

Factors in Land Values

Land should be bought reasonably as to price, and with payment spread over a long period, all terms combined being such as can be met without having to depend upon unusual good luck. Many factors are involved in what constitutes a "reasonable price"—location with reference to markets and schools, character of soil, value of improvements, state of cultivation; on an irrigated farm, character and dependability of the water right; likelihood of water-logging with consequent drainage; on a stock ranch, the average amount of forage that can be raised for winter feed; the location of the ranch in regard to the summer range on public or national forest lands, the amount of summer range the ranch can depend upon, and water supply. For the ordinary non-irrigated farm, with fair to middling improvements, good depth of moisture-retaining soil, free from alkali, and in recent cultivation, reasonable prices under present conditions range from $15 to $35. For the ordinary irrigated farm, with better improvements and in a higher state of cultivation than the non-irrigated farm, a dependable water supply, no alkali troubles or danger of water logging, reasonable prices range from $75 to $100. So many special factors are involved in stock ranch valuations that it is not feasible to attempt to give reasonable prices. More capital is required to get started in this industry than in either non-irrigated or irrigated farming.

Land Value Guides

Prospective buyers can ascertain approximate land values in a district with which they are not personally familiar through a number of agencies. There are 146 federal farm loan associations in Montana. Deer Lodge and Silver Bow are the only counties with no associations. The sixth annual report of the Federal Farm Loan Board says: "The Farm Loan Board or any Federal Land Bank will be glad to give any legitimate inquirer a statement as to any county in the United States in which business has been transacted, showing the number of appraisals made, the number of acres involved, and the average appraisal by acre in the county. This service should be especially helpful to those who contemplate the purchase of lands in territory with the values of which they are unfamiliar". Inquiries concerning appraisals in Montana counties should be addressed to the Federal Land Bank, Spokane, Washington.

The assessed valuation of specifically described tracts can be ascertained upon inquiry to the county assessor in which the land is located. County commissioners are required by law to provide for the classification of all lands in their counties, except vacant lands in forest reserves, Indian reservations and unsurveyed lands, into seven classes: agricultural lands; irrigated or non-irrigated lands; grazing lands; timber lands and stump lands; lands bearing stone, coal or valuable deposits; lands bearing natural gas, petroleum, or other mineral deposits; lands which may be valuable for more than one purpose. The classification is to be used as a basis upon which land values shall be fixed by the county assessors. Some counties have not yet completed the land classification, which the law requires to be in accordance with legal subdivisions. Inquiries to assessors should be directed to the County Assessor, addressed to the county seat of the county in which the inquirer is interested.

The State of Montana had granted to it by the federal government sections 16 and 36 in every township in the state. Some of this land has been sold, but the state still owns large tracts in every county. These tracts have all been appraised. A person interested in a specific land parcel can ascertain what the state lands in the same township are valued at by writing the Register State Land Office, Helena, Montana. The inquirer should give the number and range of the township and ask that the plat be marked to show the sections or sectional subdivisions the state owns.

Topographic Maps and Soil Surveys

Copies of plats showing all surveyed townships in Montana can be obtained at a cost of 75 cents to $1.50 from the United States Surveyor General, Helena, Montana. If the Surveyor General has a negative on hand of the township plat the price is 75 cents, but where a negative must be made to fill the order, the price is $1.50. These plats show the general topographic features of the township, such as rivers, creeks, mountains, hills, brakes, etc. To a prospective land buyer, the topographic features are the chief value. Topographic maps of a number of districts in Montana have been issued by the United States Geological Survey. They cost 10 cents each and are to be obtained from the Director, United States Geological Survey, Washington, D. C., who, upon request, will indicate what districts in the state are covered. These maps show roads, railroads, waterways, and, by contour lines, the shapes of hills and valleys and the height above sea level.

Few soil surveys have been made in Montana. A detailed soil survey of the Bitter Root valley was made in 1917 by the United States Bureau of Soils, of the Gallatin Valley in 1905 and of a small area near Billings at an earlier date. The Gallatin and Billings surveys are considered now out of date as they were based too much on the geology of the areas, rather than on the soils.

In 1921, in cooperation with the United States Bureau of Soils, the Agronomy Department of the Montana Experiment Station undertook a reconnoissance soil survey of the state. More than eleven million acres have been surveyed to the present time. The work in Sheridan, Daniels, Roosevelt and Valley counties has been completed, and about one-third of Phillips. Reports on Sheridan, Daniels and Roosevelt soon will be available for distribution. The Valley county report will not appear until later. The maps will show the topography, soil, area under cultivation and the county classification of the lands, combined with a topographical map.

Topography and Elevation

About three-fifths of the area of Montana lies east of the Rocky Mountains and the remaining two-fifths on the western side. There is not much climatic or topographic similarity between the two districts. From the main range to the eastern boundary, the country is mainly a rolling plain, with a gradual descent from an altitude of 4,000 to 5,000 feet at the base of the mountains to less than 2,000 feet at the eastern line. This plain, however, is broken in the north portion here and there by groups of mountains, and near the southern boundary by spurs from the main range, with many peaks rising to altitudes of 5,000 to 8,000 feet, and a few unnamed peaks in Carbon county to 13,000 feet. The highest named peak in the state is Granite, with an elevation of 12,850 feet. The surface of the western two-fifths of the state is made up of numerous mountain ranges, shading abruptly into foothills and valleys, the latter having elevations varying from less than 2,000 feet to 5,000 feet above sea level

One-fourth of Montana lies at an altitude of less than 2,000 feet, one-half at less than 3,000 feet, and three-fourths of the state at less than 4,000 feet. The state's average elevation is 3,400 feet, compared with Colorado's average of 6,800 feet, Wyoming's 6,700 feet, Utah's 6,100 feet, Idaho's 5,000 feet, Nevada's 5,500 feet and Arizona's average of 4,100 feet. Because of its lower altitude, climatic conditions in Montana for agricultural purposes are more favorable than in many districts of the states to the south.

The drainage of the western part of the state reaches the Pacific ocean through the Clark's Fork of the Columbia River; the drainage of a portion of the northwestern part is into Hudson Bay through St. Mary's River, and the drainage of the central and eastern districts is into the Gulf of Mexico through the Missouri, Yellowstone, Milk and Musselshell Rivers, the four largest and most important streams on the eastern side of the mountains.

THE GEOGRAPHY OF PRODUCTION

Topography and Climate Have Created Three Regions in Montana in Each of Which Distinct Farming Systems and Methods Have Been Evolved—The Livestock Industry.

With a potential farming area, according to experts, as large as the state of Illinois; a grazing area the size of Indiana; and a mountain and forest region equal in area to Kentucky, Montana has a widely diversified agricultural and livestock industry. Instead of there being one system of farming and of livestock raising, there are several systems, each calling for certain standard crops and crop rotations, or livestock species and methods of handling them.

The thrust of the main range of the Rocky Mountains, north and south, through the state, is responsible for this. It places the western one-fifth of the state on the Pacific slope where climatic conditions and agricultural opportunities are markedly different from the remainder of the state. Another one-fifth of the state occupies the eastern slopes of the mountains, which, at an elevation of 4,000 to 5,000 feet, sink into the undulating plains which occupy the remaining three-fifths of the state's area.

The district west of the main range is best adapted to diversified and specialized farming, dairying and horticulture; the district on the eastern slope of the mountains and the higher plains, to livestock raising and general farming; the plains region, to livestock raising and general farming with a crop standard somewhat different from that in the eastern slope district.

The Western Montana Region

Heavily timbered mountain ranges occupy most of the surface of western Montana which is wholly within the Upper Columbia drainage basin. They shade abruptly into foothills and valleys, the latter having elevations varying from less than 2,000 feet to 5,000 feet. Most of the larger valleys are open. The agricultural cut-over areas of the state are in the smaller valleys and on the benches. Agriculture is confined to the valleys and the benches. Irrigated farming is the dominant type, though there is some non-irrigated farming in the foothills and on the benches. In the extreme western counties, farming as practiced in the humid regions is the rule. The Bitter Root, Flathead and Missoula valleys are the most important agricultural districts. Soil and climate adapt them especially to diversified and specialized farming such as dairying, horticulture, poultry and swine raising. The horticultural reputation of the Bitter Root was achieved and is maintained on the McIntosh apple and is expanding on the sour cherry, which reaches the eastern markets when no other varieties are available and, consequently, has always commanded a good price. This cherry is also in big demand by canners. The Flathead Lake region is particularly adapted to the sweet cherry. The Bitter Root and Flathead valleys rank with the best developed, and diversified, and, during the past few years, have been among the most prosperous agricultural districts in the state. Marketing organizations of fruitgrowers and dairymen there have successfully stood the test of time. What has been accomplished in the Bitter Root is possible in the other valleys where agriculture was, com-

paratively, only recently established. Large bodies of choice irrigated land are awaiting settlement in Flathead, Missoula, Lake, Lincoln and Sanders counties. In Ravalli county large irrigated holdings are being sub-divided.

The cut-over lands of western Montana, offered at a low price and on long terms, afford an opportunity to a man of limited means to develop a farm home. Clover thrives in these districts which, at least in the early stages of development, are best adapted to dairying. Work in the lumber camps at good wages is always available during the winter.

All the cereals, together with alfalfa, timothy and clover, are among the staple crops grown in western Montana. The staple vegetables and berries and bush fruits are also raised, many of them finding ready markets in the industrial districts. Big acreages of seed peas are annually contracted, particularly in the Bitter Root and Missoula valleys. A considerable acreage is devoted to commercial potatoes. The non-irrigated districts in the Flathead have developed a potato and alfalfa seed business of considerable magnitude.

The special opportunity open to farmers of western Montana is sheep-raising. Thousands of acres of national forest range, adapted to sheep but not cattle, has not been utilized by residents of the region, so it has been leased to sheepmen from Washington and from eastern Montana. Resident farm owners, however, are always given preference by the Forest Service.

Winter temperatures of western Montana are milder, and the maximum as well as the average summer temperatures lower at the same elevations, than in the remainder of the state. While the average annual precipitation in the agricultural districts is less than in the eastern slope region but higher than in the plains region, the mean relative humidity is considerably higher than east of the mountains. Vegetation is more verdant. Of the annual rainfall, 40 per cent, occurs during the growing season, and, therefore, in the non-irrigated districts special efforts to conserve the fall and winter moisture are made.

The average winter temperature of this region is 24 degrees, of spring 41 degrees, of summer 61 degrees and of autumn 44 degrees. Winter minimum temperatures of 20 below zero are seldom recorded in the agricultural areas and the region is comparatively free from sudden and marked changes in temperature. The frost free period in the agricultural districts ranges from 92 days to 150 days, with an average of about 120 days.

The Eastern Slope and Higher Plains Region

Many fine agricultural districts are found in the valleys of the eastern slope of the mountains and in the higher plains region at the base of the main range. The elevation of these agricultural areas is seldom above 5,000 feet and is as low as 3,500 feet. Included within this region, for purposes of classification, are those isolated mountainous districts by which the eastern plain is broken here and there in the north portion, and also included are spurs from the main range near the southern boundary. The drainage of this region is into the Gulf of Mexico through the Missouri and its tributaries, the Yellowstone, Milk and Musselshell rivers which are the largest and most important streams.

The annual rainfall over most of this district averages in the agricultural areas, slightly more than it does over most of the agricultural areas of western Montana. The growing season is about the same—78 to 142 days. The extremes of temperature, both in winter and summer, are greater than in western Montana. There is less snowfall and less cloudiness. Vegetation is not so verdant. A characteristic of the precipitation peculiarly favorable to agriculture is that more than one-half of the annual amount is deposited in light rains during the growing season.

An Irrigated Potato Field

There is more irrigated land in this region than in either the Pacific slope or eastern plains regions. It is well adapted to general farming and stockraising. Dairying is growing.

The Gallatin valley in this district has long been one of the most famous agricultural districts of the northwest. Wheat, oats, peas, barley and forage are the leading crops and the livestock industry, in both range and pure-bred herds, is well developed. The Judith Basin region of central Montana, whose topography and other features naturally place it in the eastern slopes district, for many years has been one of the leading non-irrigated farming sections of the state. In this same district are included many fine lands along the Missouri river, from Great Falls southward to the headwaters of the Gallatin, the Madison and the Jefferson; and along the Yellowstone where it flows from the Yellowstone Park, eastward to Carbon county, where it receives the waters of the Clark's Fork. Many other fertitle irrigated and non-irrigated sections of this district might be enumerated—the Sun river, the Shield's river, the Smith river, the Prickly Pear and the Clark's Fork valleys.

The Plains Region

The climate of the plains region, which comprises, roughly, the eatsern three-fifths of Montana, is similar to that of the eastern slope of the mountains. The extremes of temperature are more pronounced, both in winter and summer, the growing season averages longer and hotter, the snowfall is lighter and the climate drier on the whole. The growing season averages from 125 to 150 days. While the annual rainfall is two and a half inches less than in the eastern slopes region, the annual rainfall during the growing season is only one and two-tenths inches less, and about seven-tenths of an inch less in May and June.

Broadly speaking, this region, which mostly lies at an elevation under 3,000 feet to less than 2,000 feet, has a broader crop range than the eastern slopes region. It is well adapted to general farming and stockraising in which prominence is given to crops that require a consistent heat, such as corn and beans, rather than to crops which do better where the nights are relatively cooler than the days. It will probably always be an important wheat district. More than half of the present production of wheat in Montana comes from the plains district and as large areas of tillable land now lying idle are brought into cultivation

Corn Is Bringing in Hogs

when transportation and marketing factors are improved, the dominance of this district in wheat production is more apt to grow than to decline. It is also, and will continue to be, the dominant region in the state of corn production. On non-irrigated farms in this part of the state, corn is becoming one of the most important crops, for fodder as well as grain. It is not generally known that eastern Montana raises watermelons so successfully, that Rosebud county watermelon-growers have organized an association for the marketing of a crop that finds favor with the consumer and which reaches him when there is no competition to the Montana grower from other districts.

There is more arable land in the plains region than is found in both the western and eastern slopes regions combined, and more land is in farms, but with a few exceptions, agriculture has not reached the same stage of development as in the districts to the west. The exceptions are found on the irrigated lands, the acreage of which in comparison to the acreage of the non-irrigated lands is small, and confined principally to the Yellowstone valley, the Big Horn valley and the Milk River valleys. Most of the irrigated lands along the Yellowstone, and many along the Big Horn, are well improved and in a good state of cultivation. The Milk River lands are just being developed. Smaller irrigated or irrigable tracts are also found along the Missouri and Musselshell rivers and smaller streams in this district.

Types of Farming

Irrigated and non-irrigated farming, both requiring special methods, the former to put the water upon the crops and at the time that insures maximum yields, and the latter to conserve by tillage and the proper crop rotation the natural precipitation, are the dominant types of agriculture, though in certain districts, such as the Judith Basin, where the annual precipitation averages 19 inches, the farming system of the middle east has proved successful.

Aside from the lands in the valleys of the Yellowstone and the Milk rivers, and their large tributaries, non-irrigated farming is the rule in the eastern half of the state. More irrigated lands are found on the eastern slope of the mountains than in any other part of the state, but even here the acreage in non-irrigated farms is vastly greater compared to the total agricultural area. Irrigated farming antedates even the discovery of gold in Montana while non-irrigated farming developed only after the waning of the range days. It grew slowly in the first decade of this century and then burst all reasonable bonds, expanding

to lands that were never adapted by climate or soil conditions to agricultural purposes. Its proportions are indicated by the 145,000 homestead entries, covering thirty-five million acres of land, made in Montana during the period from 1910 to 1922.

Non-Irrigated Farming

Like all new developments, non-irrigated farming has suffered set-backs. That it is a permanent system of agriculture under which millions of acres of land will be turned into real farm homes and that it is a system which will survive under the most adverse of drouth and economic conditions was revealed in a special farm survey made in 1922 by the Montana Agricultural College. Briefly, the survey disclosed the most successful general farmers were those who grew most of their own living, who handled large acreages—from one to two sections—with a minimum of labor through the use of ten and twelve horse one-man outfits. This made the overhead per acre low so that even a small yield showed a profit, while in the years of bumper harvests, the per-acre profit was large. Successful non-irrigated small farms, specializing in dairying and poultry-raising were also found, as well as many general farms that featured alfalfa, brome and other grasses, potatoes and corn for seed. The plains region of Montana is treeless, but successful shelter belt plantings that have become beautiful groves, show it is possible to change this in every district of the state when the owner is actuated by a desire to create a home.

The general conditions that surround non-irrigated farmers and under which they live, are set forth in a report "Farming in Northeastern Montana," issued January, 1923, by the Bureau of Agricultural Economics, United States Department of Agriculture. It is based upon a study of the operations of 151 farmers in Sheridan and Daniels counties. Only 26 of these farmers bought; the others homesteaded. Only 25 farmers were in the district in 1908, or earlier, and 60 of them came in after 1913. In Sheridan county the average size farm was 492 acres, of which 230 acres were in crop and 30 acres in fallow. In Daniels county the farms averaged 519 acres, of which 210 were in crop and 39 in fallow. Homesteaders who have been in the area for only three or four years ordinarily have few improvements and little equipment, while some of the men who took homesteads in the early years have well-equipped homes and large, well-built farms. Many farms have windbreaks. More than half the 151 farmers had automobiles and 49 owned tractors.

As a result of their farming activities alone, 64 per cent of the Sheridan farmers and 54 per cent of the Daniels farmers "have made a living and bettered their financial condition since settling . . . . . The returns from their farming activities and the change in the value of land, combined, resulted in the betterment of the financial condition of 92 per cent of the Sheridan county and of 82 per cent of the Daniels county farmers". The average net worth of the Sheridan farmers was $9,138 and of the Daniels farmers $7,189.

A Sixteen Horse One-Man Outfit

A Phase of Stable Farming

These results were attained largely under the one-crop system. Wheat, oats, and flax were practically the only crops sold. Total annual sales of livestock per farm averaged $50 for Sheridan county and $86 for Daniels. The sale of livestock products for all farms amounted to an average of $106 for Sheridan and $123 for Daniels. The report states the number of horses and cattle per farm, especially the latter, "seems low for a region which at one time was wholly devoted to grazing". Few of the farmers kept hogs the year around, but most of them kept poultry.

This survey corroborates the conclusions reached in the survey by the State Agricultural College of a different non-irrigated district; that the number of crop acres had considerable bearing on the farm income; the greater the crop acreage the larger the income. (In Daniels county, for instance, the men who had less than 100 acres in crops lost on their farm operations.) It is apparent that not enough attention has been given to livestock products or to gardens for home use. Corn was grown by 51 farmers and the majority felt that every farmer in the area would find the crop profitable.

Non-irrigated farming is just emerging from the formative, one-crop stage. Corn is making revolutionary changes, paving the way for silos and general purpose cows whose steer calves will grow into beef on the public or the national ranges and whose heifers at the pail will increase the creamery check. Corn is bringing in hogs. The first carload of Montana beef fattened on Montana corn left the state for a west coast market in March, 1923. Wheat probably will continue to be the biggest cash crop on the non-irrigated farm, but corn will be the foundation of a diversified agriculture whose income will be distributed over the year. The hen is taking its place alongside of the hog and so is the turkey, which seems especially adapted to the Montana environment. The Montana turkey is more of a factor today on the Chicago market than is the Montana hen.

Irrigated Farming

Because moisture, the controlling factor of crop production in Montana, is under the absolute control of the irrigated farmer, that type of farming affords a much wider field for diversification or specialization than does the non-irrigated type. In the most prosperous irrigated districts the tendency is toward intensive or specialized farming—sugar beets, peas for seed and canning, beans, potatoes and other root crops; pure-bred livestock, hogs, dairying, winter fattening of lambs and

Sugar Beets in Yellowstone Valley

other livestock that come from the nearby ragnes. Perhaps the most frequent mistake in irrigated farming is the attempt to farm too much land. More labor per acre is required in this than in other kinds of farming and it is justified by the increased yields, but if the labor is distributed over too many acres or applied at the wrong time (as irrigating too late) the crop yields oftentimes are no larger than on the non-irrigated lands. A tract of eighty acres is large enough for the beginner. An irrigated farm is especially adapted to the turning off of concentrated products, but if a farmer does not intend to convert his cereals and forage crops into beef, mutton, wool, dairy and poultry products, it is questionable if general farming, with the higher land values and labor costs on the irrigated farm, will be as profitable as on the well-managed non-irrigated farm.

The Livestock Industry

Though the range cattle and sheep industry is still important in many districts of eastern Montana by reason of grazing lands on Indian reservations or bad lands on the public ranges that the homesteader passed up, the region of its greatest concentration and development is at present in the mountainous and hill districts along the eastern slope of the continental divide, and particularly in southwestern Montana. There are a number of reasons for this. Extensive grazing areas on the national forests are in close proximity to the irrigated lands of the agricultural districts. In proportion to the tillable area, there is more irrigated land in this region than in any other in the state. Many of these irrigated lands are found in mountain valleys, at elevations ranging from 4,000 to 5,500 feet, where, because of a comparatively short growing season, forage crops are the most profitable. There are a million and a half acres of public domain in this region, which, because of its rough nature, probably will not be filed on. National forests and public lands furnish summer grazing and the irrigated lands winter forage. The formation is chiefly limestone, a feature which is characteristic of all good livestock districts. Numerous streams of good water abound.

A bird's-eye view of the stockraising industry in Montana appeared in The Breeder's Gazette December 21, 1922, in an article by Will C. Barnes, assistant forester in charge of grazing for the National Forest Service. "In my judgment,"

he wrote, "Montana stands at the head of the western states in almost perfect balance that nature has provided for its range stockmen, as between the different ranges, spring, fall, summer and winter, together with the forage cover . . . . . One might well exclude winter range, for today no wise stockman in Montana thinks of depending on winter range exclusively. . . . . Winter pastures, however, close to the feedyards, into which stock can be turned while the weather holds good, are a vital part of their grazing plans.

"The state also is singularly well provided with natural resources which fit into stockraising. Except in a few sections in the eastern part of the state, they have everywhere an abundant supply of water, from clear, pure mountain streams, for irrigation purposes. Natural meadows are plentiful, furnishing as much as two tons to the acre, the wheat, grama, and blue-joint grasses making excellent hay. Apart from these meadows, supplemented in many cases by fine fields of alfalfa, we find rolling prairies and charming foothills, where the same grasses, together with the native bunch grass, furnish fine grazing in the early spring and again in the fall. Back of these are the mountain ranges, rough and rugged, but famous grazing areas, mostly in the various national forests.

"The seasons in the mountains are short—not over four months, on an average—but in that time stocks puts on a wonderful coat of flesh, with the firmest, whitest of fat . . . . . .

"The hazards of the western range stock business are never entirely obliterated, but I believe that stockraisers in Montana have about the lowest risks of any western range state."

While asserting that "invariably the livestock of Montana is of high quality," Mr. Barnes doubts the wisdom of holding steers until they are fours, and, looking to the future, he says, "I have an idea that this aged steer business will give way to a shorter season of grazing, perhaps dropping clear out the idea of producing fat beef, and, instead, sending on feeders that will catch the eye of corn-belt farmers".

In districts that primarily are only adapted to stockraising the present tendency is toward a consolidation of small holdings into one under a single ownership. This is especially evident in southwestern Montana. In other districts where general farming is done, the tendency is the other way and for the farmer who has been selling his surplus hay to the range men to acquire sheep or cattle of his own. A most successful farmer on irrigated land explains his prosperity upon the grounds that if he can only break even on crop production he is sure of a good profit through the utilization by livestock of by-products that otherwise would go to waste.

While the ranges of eastern Montana are not turning off the livestock of former years, that region will come back when diversified farming supplants the one-crop system on the non-irrigated farm. The change is foreshadowed al-

Sheep Predominate in Livestock

Large Areas Adapted to Beef Making

ready in the co-operative associations now successfully handling the stock of shippers of less than carload lots. The number of such carloads steadily increases, but instead of raising beef alone, the small farmer is also producing hogs.

Hog Raising

While Montana, as well as the other northwestern states, does not now produce enough pork to meet consumption, the growing interest and success in swine-raising indicates this condition will be changed in Montana. Students of animal husbandry are inclined to believe there will be two distinct swine industries in the state—one, located in those irrigated districts not adapted to corn but to alfalfa and small grains where feeders can be economically raised and disposed of in the corn districts for finishing.

Dairying

Most of the agricultural districts west of the continental divide are naturally adapted to dairying and the industry is more developed in this region than east of the divide. The grasses are more lush than on the eastern side, the season of green pasturage is longer and the climatic environment is favorable to milk production. Where these conditions obtain, and, in addition, the tillable lands are irrigated, dairying is becoming one of the chief industries. Cow-testing associations are being formed and many high-producing cows shipped in.

East of the mountains, dairying is largely confined to the irrigated districts. Its possibilities are just being realized. Irrigated pastures, easily carrying two cows to the acre, more than double the period of flush production, and insure a longer grass season than is found in all but a few extremely favored districts in the northern half of the United States. The irrigated farmer raises his own alfalfa for winter forage and the grains required in a balanced milk production ration. What can be done in this line is shown in a report of the United States Department of Agriculture on thirty-two cows owned by it that completed official records with an average of 10,910.7 pounds of milk and 461.36 pounds of butter fat. Four of the records were made by cows on roughage alone at the government irrigated farm at Huntley, Montana. One cow, brought from the government farm in Maryland, made a higher record on roughage alone at Huntley than she did on roughage and grain in Maryland.

Crop and Stock Statistics

Wheat is the leading crop in Montana and also the chief farm product. In 1922 its value was $41,162,500; it occupied 3,099,000 acres, more than equalling the value and the acreage of the eight other major crops combined. These eight other crops were valued at $39,492,000 and occupied 2,932,000 acres. The value per acre of wheat was exceeded only by sugar beets, potatoes and flax. Hay in 1922 held second place in crop acreage and value and second place among farm products. The crop was worth $22,808,000 and occupied 1,737,000 acres.

Cattle and calves sold and slaughtered ranked third in farm products with a value of $18,560,000. The decided bent toward diversification is shown by the fact that combined, dairy, poultry products and honey, took fourth place among the farm products with a total value of $17,498,000. The sheep industry, both wool and mutton, ranked fifth with an output valued at $14,019,000.

The acreage, total value, and value per acre of the other major crops in 1922 were: Oats, 700,000 acres, value $7,104,000, per acre value, $11.84; corn, 219,000 acres, value $2,902,000, per acre value $13.25; potatoes 46,000 acres, value $2,318,000, per acre value $50.40; flax, 127,000 acres, value $1,751,000, per acre value $13.79; sugar beets, 13,500 acres, value $1,022,500, per acre value $75.00; rye, 126,000 acres, value $987,000, per acre value $7.83; barley, 77,000 acres, value $962,000, per acre value $12.50; apples, value $610,000.

Crop Production Tendencies

While wheat will probably continue to be Montana's leading crop, its relative importance is certain to be diminished at the rate of increase shown by other crops which are adapted to diversified farming. The acreage in wheat is declining, that in oats and hay is holding its own, while the acreage in rye and corn is consistently increasing. All these are feed as well as cash crops. Corn and rye, experience has proved, are more certain crops on the non-irrigated farm than wheat and are better adapted to swine and stock raising. In the past five years the acreage in corn has more than doubled and that of rye was six times larger in 1922 than in 1918. The acreage in sugar beets, flax, beans, peas for seed and canning and other crops indicative of increased diversification are also expanding.

Irrigation Statistics.

While the last federal census in Montana showed there were thirty-seven million acres of land in farms, there were only eleven million acres of improved land, fifteen per cent. of which was irrigated. Of the 58,000 farms in the state, 11,000 were irrigated.

Homesteading Era Gone

The agricultural opportunities in Montana can perhaps be visualized by further reference to the census. The average size of a Montana farm was 608 acres, of which 198 acres, or 31.4 per cent, were improved. Only Wyoming and New Mexico have larger farms and only North and South Dakota have a larger improved acreage per farm than Montana, but in the percentage of improved acreage per farm, Montana does not rank high. With more settlement, the acreage per farm will decline but the percentage of improved acreage will increase. Homesteading, so far as good land is concerned, is a thing of the past in Montana. The opportunity today is to improve and expand upon the work of the pioneer settlers.

Besides the land actually irrigated the year the census was taken, the state irrigation commission reports there are approximately a million acres more that can be irrigated by works being constructed or proposed or by works built but not in use. Among others, on federal reclamation and Indian projects there are 200,000 acres, in districts organized under state laws 400,000, and on Carey act projects 85,000 acres. When this land is being farmed, there is still an additional two million acres that is susceptible of irrigation.

THE CLIMATE OF MONTANA

*Far Less Rigorous Than Generally Realized—Winters Have More Cloudless Days and Less Precipitation Than the East—Most Moisture Falls During Growing Months—Long Days Make for Maxmium Vegetative Growth.**

The winter climate of Montana is much pleasanter and far less rigorous than most people realize. True, some low temperatures are occasionally recorded, but these, as a rule, do not continue for long periods and are accompanied by a dry and comparatively calm atmosphere, which renders them more endurable to animal life than much higher temperatures where these conditions are absent. It is largely due to these features that stock can be raised on ranges without shelter (a system followed now only by big cattle outfits), and that outdoor occupations can be carried on with little interruption or discomfort during the winter and spring months. It is no more sensible to interpret the Montana climate in terms of the extreme minimum temperature recorded than it would be to judge the climate of some of the southern states by the zero temperatures that have been recorded in some localities along the east Gulf coast, or by the temperatures of 25 below zero that have been recorded in February as far south as Kansas and Missouri.

Some Winter Temperatures

A study of the mean average temperature for January, as a typical winter month, is a better index of the climate. The January mean temperature at Helena, Montana, is 20 degrees. Des Moines, Iowa, approximately 400 miles to the south, has a January mean of 20.4 degrees. Chicago's January mean is 23.7 degrees. Havre, in northern Montana, sometimes erroneously called the coldest place in the United States, has a mean for January of 13.5 degrees, which is considerably warmer than Duluth, Minnesota, with 10.4 degrees, than St. Paul, Minnesota, with 11.6 degrees, than Devil's Lake, North Dakota, with 0.3 degrees. The January mean at Yankton, South Dakota, is 15.5 degrees. These mean temperatures do not tell the whole story. In a dry climate, such as Montana's, a temperature of freezing or lower, is much more bearable than in a region where the relative humidity is higher, as in Iowa and Illinois. Residents of Montana, visiting eastern cities, invariably suffer more discomfort and feel the cold more keenly of an average winter day in those districts than they do during the sharpest "cold spells" in their own state. The higher temperature in the east is more than offset by the lower humidity in Montana. A temperature of 15 above at Chicago gives a more penetrating cold and more bodily discomfort than does the occasional temperature of 15 below in Montana.

There are more cloudless winter days in Montana than in most parts of the country. Over most of the state precipitation falls on only 10 to 20 days during the winter months of December to February, inclusive, compared with 20 to 40 days in all states east of the Mississippi river, and the states west of Montana. In northwestern Montana there are 20 to 30 days during this period on which

Foot-note: This article is based upon data found in the "Atlas of American Agriculture," Part II, Climate, Section A, Precipitation and Humidity, issued March 15, 1922, by the Office of Farm Management, U. S. Dept. of Agriculture; Bulletin Q of the U. S. Weather Bureau; Circular 87, Montana Experiment Station, "A Further Report on Montana Climate;" annual summaries, Montana Section, and other publications and reports of the United States Weather Bureau.

precipitation occurs, and in the extreme northwestern part of the state, 30 to 40 days.

Two to Three Months of Snow Cover

While the annual average snowfall, in inches, over most of Montana is the same as in North Dakota, South Dakota, Nebraska, Iowa, the northern part of Missouri and parts of Illinois, Indiana, and Ohio,—30 inches—the snow in Montana is light and dry, resulting in a much lower average winter precipitation than is found east of Minneapolis, Sioux City, Dodge City and Amarillo. West of the main range of the mountains in Montana the snowfall, except in the high mountains, averages from 30 to 65 inches, being lowest in the Bitter Root valley.

Over the greater part of Montana there are only 60 to 90 days with snow cover, which is the same period of snow cover to be found in a part of North Dakota, Wisconsin, northern Iowa, and districts in Michigan, New York and Pennsylvania. In Montana, west of the main range and, according to the Atlas of American Agriculture, in far northeastern Montana, in Sheridan, Roosevelt, Daniels and parts of Richland and Valley counties, there are 90 to 120 days with snow cover, which is the same period of snow cover over most of North Dakota, the southern part of Minnesota, and a goodly portion of Wisconsin, Michigan and New York. The only district in Montana with an average of more than 120 days of snow cover is in the high mountains near the Yellowstone Park. The average date of the first snowfall in the autumn in Montana occurs earlier than it does in the other states named, except most of North Dakota, and northern Minnesota, and the extreme western part of South Dakota and Nebraska. In most of Montana the average date of the first snowfall is from October 1 to October 16, but in the southwestern part of the state the average date of the first snow is prior to October 1. This early snow seldom remains or interferes with farm operations.

There is less interference with plowing and spring planting operations during the months of March to May, inclusive, from days on which precipitation occurs, to most farmers in Montana, than is the case with the farmer in Indiana, Ohio, Pennsylvania, Kentucky, southern Illinois, and a number of other states. In those states there are 30 to 40 days during these three months on which precipitation occurs; in northeastern Montana there are only 10 to 20 days, and over the rest of the state from 20 to 30 days, except for a small district near the Idaho line which is not agricultural in character. The average March temperature in Montana is 30.1 degrees, April 46.4 degrees and May 51.1 degrees. The average precipitation in March is .97 of an inch, in April 1.18 inches and in May 2.44 inches.

Most Precipitation During Growing Season

While Montana does not get the precipitation that the middle western and eastern states do, there are several factors that help to overcome the deficiency. A charcteristic of the annual precipitation that is peculiarly favorable to agriculture is the large percentage deposited during the growing season. The amount received in the months of May to August, inclusive, nearly equals that for the remaining eight months. During this same season, over the eastern two-thirds of the state, more than half of the precipitation occurs at night, when evaporation is less active, the moisture penetrates the soil to a greater depth, a crust is less likely to form, and a maximum of benefit is derived. From the point of view of interruption to farm work and therefore of economic production, this point is also of significance. "It is of interest to note," states the Atlas of American Agriculture, "that the region of dominant night rainfall is one in which a large amount of wheat is grown, and also that the greatest concentration of night rains comes in the harvest season. The advantages of this nocturnal concentration cannot be over-estimated, as otherwise great difficulty would be

experienced in harvesting and threshing the immense crop grown." Another compensating factor is that the rains in Montana during the growing season are rarely of a torrential character and practically all that falls can be utilized in plant development.

"It is usually considered," says the Atlas of American Agriculture, "that between 15 and 20 inches of annual precipitation, broadly speaking, determines the dividing line between areas where farming operations can be successfully conducted by ordinary methods and those where irrigation or other special methods are necessary, but no hard and fast rule can be laid down in this connection. With an annual precipitation of only 15 inches other conditions must be very favorable for profitable agriculture by ordinary methods. There are in Montana, eastern Washington, and elsewhere in the northwest, important grain-producing areas which receive, on the average, less than 15 inches of precipitation annually. In fact, wheat is grown in eastern Washington on only nine inches' annual precipitation, but in these areas special care is given to conserving the moisture of the non-growing period for use during the following season."

The greatest annual precipitation in Montana occurs over that portion lying west of the continental divide and in the higher mountain regions, and the least over the northeastern plains. There is, however, at least one notable exception to this rule in a considerable district at the eastern base of the main range in the central portion with very light rainfall. About one-half of the area receives from 10 to 15 inches annually, and the remainder of the state from 15 to 25 inches. Amounts of 20 inches or more, at the lower altitudes, fall only over limited areas, principally in the northwestern portion.

Three Rainfall Districts

"The area of the state falls into three natural rainfall districts," states Circular 87, Montana Experiment Station, A Further Report on Montana Climate, "which may be termed the eastern and the western mountain and the plains districts, the plains being the region of later settlement in an agricultural sense."

The mountain district west of the main range shows an annual rainfall of 20.37 inches, with extremes ranging from 11.29 inches to 34.25 inches. The average rainfall for the growing season of April, May, June, and July is 6.23 inches or but 40 per cent of the annual. In the northwestern corner of the state the seasonal rainfall is even a smaller proportion. Only 26 per cent of the rain of the year comes in May and June. This district must make a special effort to conserve the fall and winter precipitation.

"In the mountain district east of the main range the average yearly rainfall is 16.22 inches, varying from 11.09 inches to 23.53 inches. The rainfall for April, May, June and July is 53 per cent of the annual and that for May and June is 35 per cent of the annual.

"The plains area of the state is drier than either of the mountain areas. The average yearly precipitation is 13.63 inches, with a range from 12.06 inches to 15.51 inches. The rainfall for the growing season is about 55 per cent of the annual and that for May and June is 37 per cent of the annual.

"Contrasting the districts east of the continental divide, it is noted that while the plains district has over two and one-half inches less annual rainfall it has only one and two-tenths inches less during the growing season and about seven-tenths of an inch less in May and June."

Good Harvest Weather

Unusually favorable climatic conditions prevail in Montana during the harvest and fall-work season. August is the chief harvesting month with an average precipitation of only 1.10 of an inch distributed over a period of three to six days. As a result, practically no time is lost in the fields and maximum harvesting efficiency is insured. September is a wetter month with an average of 1.41 inches of precipitation distributed over a period of six to nine days. This in-

creased precipitation comes at an opportune time, affording sufficient moisture to germinate fall-sowed crops, to revive pastures and stubble fields, and to permit fall plowing. Rarely does it interfere with digging of potatoes and other root crops.

October—when the peak of crop marketing is reached in Montana—has an average precipitation of .99 inches, distributed over a period of three to six days. The roads are firm and the average temperature (44.6 degrees) is just right to permit teams to exert their greatest efforts. October is also a busy month for plowing, (the September precipitation normally being retained in the soil); for getting in a year's supply of fuel—wood from the mountains in the western part of the state, and in the eastern part of the state lignite or sub-bituminous coal from the numerous coal banks that abound. Favored, indeed, is the Montana farmer by October climatic conditions.

Violent local storms are exceedingly rare, says Bulletin Q of the United States Weather Bureau, and practically the only climatic element causing directly the loss of life or property is the high northerly wind with rain or snow and freezing temperature, and losses from this cause, which are confined mostly to the eastern plains, are in a great measure preventable, if not wholly so.

In the articles descriptive of the counties climatological data are given for all but Treasure and Daniels counties. The longest growing season is 150 days, found at Miles City, in eastern Montana, and at Kalispell, in northwestern Montana, on the western side of the mountains.

Frost Free Days

Heat Units

The number of days in the growing season does not tell the whole story, however. An important factor is the number of heat units during the frost free period. A heat unit, as the term is used in agriculture, is each degree of mean temperature above 40° F. between the last killing frost in the spring and the first killing frost in the fall. Normal daily temperatures are available at only four places in the state—Miles City, Kalispell, Havre and Helena. During the growing season at Miles City there are 3,843 heat units while at Kalispell there are 2,716 heat units over the same number of frost free days. The growing season at Havre is 126 days and at Helena 142 days, but both stations have the same number of heat units—3,006. Some crops will do better under Havre conditions with its shorter growing season but more intense heat than they will at Helena with a longer growing season but less intense heat, and vice versa.

Another important factor, according to plant pathologists, besides the length of the growing season and the number of heat units, is the number of hours of sunlight. No state has a larger possible number of hours of sunshine than has Montana. The state is also fortunate in that, in this northerly latitude, its longest days occur during the growing season and the highest percentage of the possible hours of sunshine is attained during this same season. Referring to the effect of sunlight on crops, the United States Department of Agriculture says, "This principle affords the clue to the fact that many plants grow most luxuriantly near the northern limit of their range. The long northern day allows them to attain their maximum growth before the shorter day intervenes to check vegetative growth and start the reproductive process."

MONTANA WEATHER*

	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct	Nov.	Dec.	Annual
Mean Temp.	19.8	21.4	30 1	46.4	51.1	59.5	66.	64.5	54.7	44.6	32.	23.3	42.8
Mean Prec.	.91	.73	.97	1.18	2.44	2.55	1.54	1.10	1.41	.99	1.01	.84	15.67
Ave. days with .01 or more of prec.	6	5	6	6	9	9	6	5	6	5	5	5	73
Ave. clear-days	12	12	13	12	12	14	19	19	16	16	12	12	169
Av. part cloudy	9	8	8	9	10	10	8	8	7	8	8	9	102
Av.cloudy days	10	8	9	9	9	6	4	4	7	8	10	11	95

*Based on records covering 1895 to 1922 inclusive.

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The Counties of Montana

Grouped into districts as adopted by the Montana Co-operative Crop Reporting Service.

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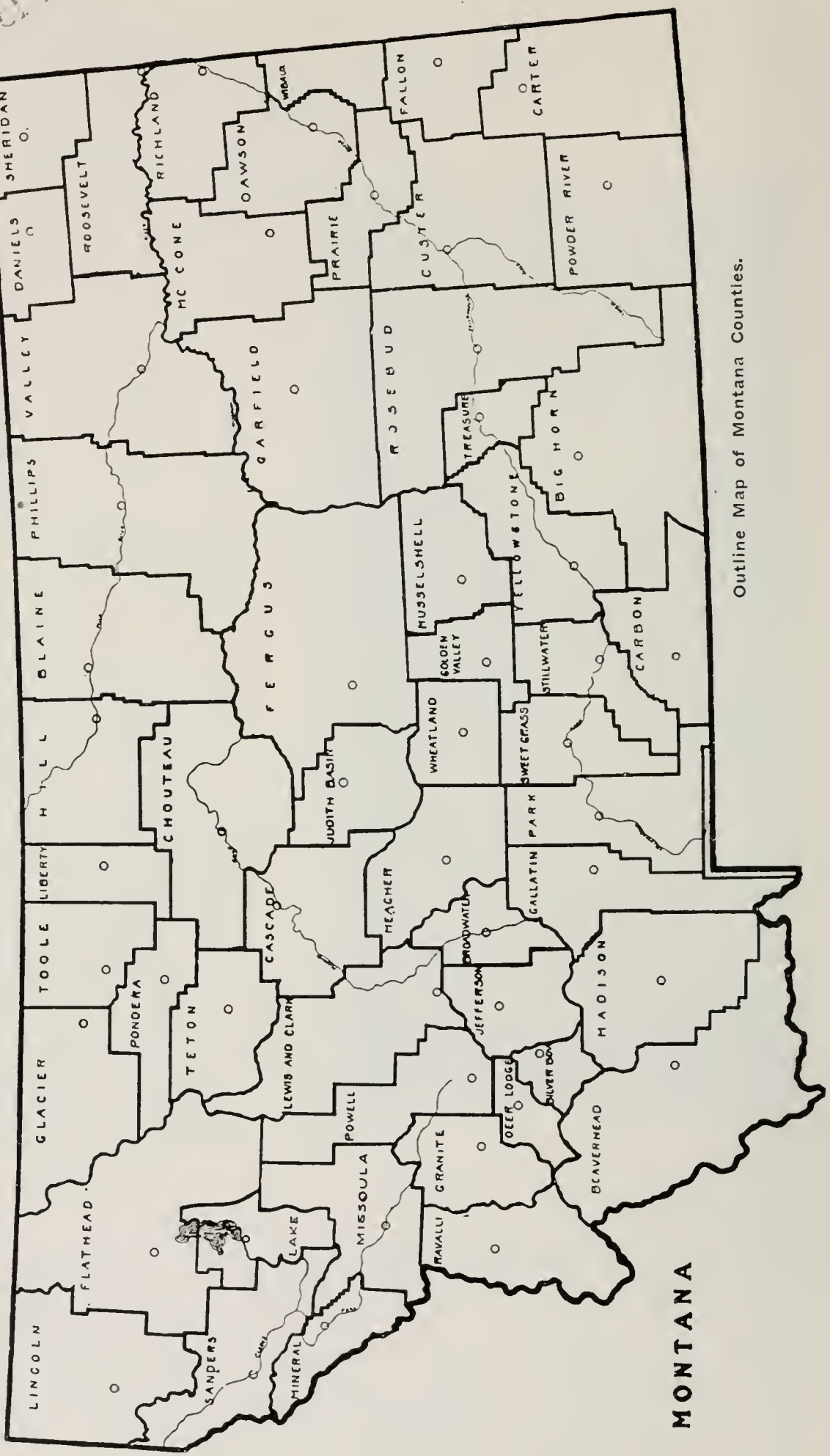


Outline Map of Montana Counties.

SOUTH EASTERN MONTANA

Stockraising and Non-Irrigated Farming the Chief Industries—One of the Leading Corn Districts, Large Coal Fields—Rail Facilities Hinder Development of the Southern Part.

In the days of the trail herds one of the most noted stock districts of the northwest, stockraising still continues to be the leading industry of South Eastern Montana, which embraces Carter, Fallon, Custer, Powder River, Rosebud, Treasure and Big Horn counties. Except in the Yellowstone and Big Horn valleys, non-irrigated farming is the dominant method of agriculture. The one-crop system has prevailed but in recent years corn, to which the region is well adapted, has been introduced, and the acreage devoted to it is rapidly expanding. Most of the southern half of the district is handicapped by lack of railroad facilities. Considerable alfalfa seed is raised. In the irrigated districts of Rosebud, Treasure and Big Horn counties sugar beets are grown. In Rosebud and Treasure watermelons and cucumbers, and in Powder River county, popcorn, are receiving attention.

The largest coal measures in the state underlay this district, and it is the leading producer of natural gas. Oil in commercial quantities has been found in the western part where there is also considerable undeveloped hydroelectric power and big deposits of gypsum.

The growing season ranges from 120 to 145 days and the elevation from 2,300 to 3,000 feet.

CARTER COUNTY

CARTER, in the southeastern corner of Montana, bounded by Wyoming on the south and by South Dakota on the east, is a county of potential possibilities rather than of actual development. Lack of rail transportation facilities is responsible for this. Livestock raising is the chief industry. Agriculture has progressed far enough to demonstrate it has a bright future. The county possesses large coal fields, some deposits of barite, building stone, and has many potential oil domes, on several of which drilling is under way. There is practically no irrigated farming but in the south end of the county, on the Little Missouri, there is a considerable area that can be irrigated. The county possesses several resources that help to overcome the handicap of remoteness from the railroad. The coal fields provide abundant and cheap fuel, and the timber in the Sioux National Forest, which is in three tracts, lumber for building purposes.

While here and there the surface is broken, most of the county is undulating prairie. The regions too rough for cultivation are devoted to grazing. The soil varies from a sandy loam to a heavy gumbo.

In the early range days the area included within this county was known as one of the best grazing regions in the northwest. Because of its natural adaptation and the general topographical conditions which are favorable for livestock production, this industry will probably always be an important one. In the south end of the county, particularly, there are many bands of sheep and herds of cattle and horses. Owing to the lack of transportation facilities, farmers are finding that though they can obtain good yields of high quality wheat, products that can be marketed either on foot or in a concentrated form bring better returns. Considerable dairying is being developed in the central part of the county and farming combined with livestock raising is generally followed. Many farmers have found poultry profitable, especially turkeys, which thrive on the open range and take care of themselves until almost ready for market. An increasing number of farmers are coming to believe that corn and hogs are the most winning proposition. Even in 1919, the dryest year known since farming began in the county, there was some good corn and considerable fodder raised. The hot growing season and the comparatively low elevation make the region adapted to this crop, a fact attested to by Carter county winnings at state and inter-county corn shows. Forage crops include sweet clover, alfalfa and tame grasses. Potatoes and garden truck, including muskmelons and watermelons, do well.

Favorable For Livestock

If oil is discovered, the time will be quickened in which rail transportation facilities will be furnished. The Miles City-Black Hills Trail crosses in a southeasterly direction the northern part of the county while the Miles City-Belle Fourche highway passes through the south end. Baker, on the Milwaukee, is the rail outlet for the north end, and Bell Fourche, South Dakota, for the south end.

Ekalaka, 42 miles south of the Milwaukee railroad, in the north end, is the county seat, the largest town, and a hustling little community. It has among other industries two flour mills and a creamery which has been an important factor in both an educational and financial way in developing dairying. The second largest town is Alzada, in the extreme southern part. Piniele is a trading center for a considerable district. General stores are operated at Capitol, Albion, Boyes, Belltower, Sykes and Ridge.

Roosevelt's Stamping Ground

This is Theodore Roosevelt's old stamping ground when he operated a cattle ranch on the Little Missouri, just across the line in Dakota. In "Hunting Trips of a Ranchman," he describes it. Medicine Rocks, a fantastically weathered sandstone formation in the northern part of the county, has been likened to the "Garden of the Gods" in Colorado. In the Sioux National Forest attractive scenery is found.

CARTER COUNTY—Ranks forty-sixth in population (3,972); fifteenth in area (2,160,000 acres); thirty-fourth in combined 1922 crop and livestock value; twenty-ninth in 1920 mineral production; fifty-third in bank deposits, 1922; fiftieth in assessed valuation, 1922. Acres public land, 547,406; acres state land, 116,809; acres national forests, 88,342.

WEALTH PRODUCTION—Estimated 1922 crop value, $644,000; estimated livestock value, January, 1923, $2,231,000; coal production, 1920, $6,023; 1921 lumber cut, 276 M feet; total bank deposits, September 15, 1922, $136,297.

TAXATION 1922—Total assessed valuation, $9,544,256; total taxable value, $2,887,251. Total outstanding county bond indebtedness, $151,299; total outstanding county warrant indebtedness, $40,968; total outstanding school bond indebtedness, $47,250; other school debts, $4,007. Total general and special county taxes, $67,316; total general and district school taxes, $65,196; total municipal taxes, $1,764; total state taxes, $14,875; total tax (inclusive municipal), per capita, $37.55.

EDUCATIONAL—Number graded schools, 60; enrollment, 895. Number high schools, 1; enrollment, 58.

BUSINESS STATISTICS—Number of manufactures, 11; average number wage earners, 10; value of products, $52,523. Number of banks, 2. Number general stores, 14; confectionery, etc., 1; groceries and meats, 2; lumber yards, 2; total number merchants, 48. Total assessed valuation 1922 merchandise, $81,313. Number creameries, 1. Number flour mills, 2. Number saw mills, 7. Number of lawyers, 5. Number of physicians, 3.

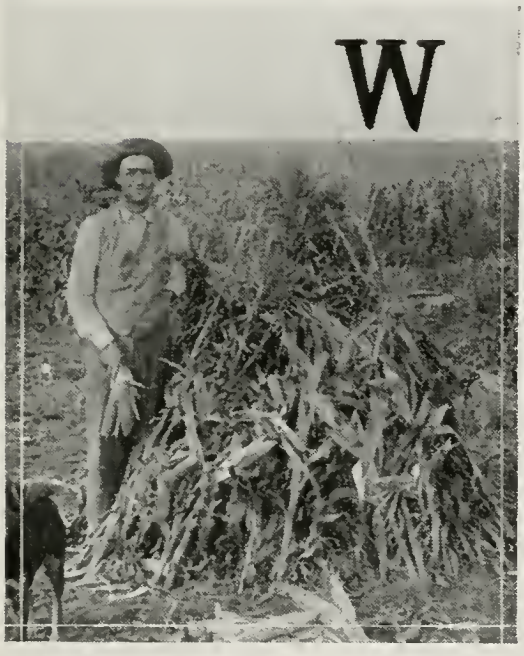
AGRICULTURE (1920 census)—Number farms, 855; farm acreage, 557,495; improved farm acreage, 83,763; irrigated acreage, 380; average value all property, per farm, $10,784. Livestock assessed 1922—number cattle, 23,280; number sheep, 75,957; number horses, 10,854; number swine (census), 1,004.

CLIMATOLOGICAL DATA—At Ekalaka. Elevation (estimated), 3,000 feet. Average date last killing frost in spring, May 25; average date first killing frost in fall, September 22.

	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Ave. Prec.	.39	.35	.66	.91	2.26	2.48	1.7	1.58	1.36	.73	.28	.30	13.
Ave. Temp.	18.7	18.6	30.5	43.6	52.9	63.4	70.4	68.4	59.3	46.0	33.3	21.8	43.9

County Seat, Ekalaka. Population County Seat, 433.
County Agricultural Agent—No.

FALLON COUNTY



WHILE non-irrigated farming is the chief industry of Fallon county, it has expectations that its natural gas field, which is pronounced one of the biggest in the country, its large coal measures and other minerals will eventually make it important in an industrial way. It is one of the best corn regions in the state. Situated in the extreme southeastern part of the state, its eastern boundary adjoining North Dakota, the greater part of the area of Fallon county, 60 miles long north and south, and 40 miles wide, consists of uplands with gently rolling prairie lands which are devoted to non-irrigated farming. The soil varies considerably, ranging from heavy clay loams which require careful cultural methods, to lighter sandy and sandy clay loams. In the western and southern districts, the latter types predominate. Little land is irrigated, but large flowing wells have been developed in some sections.

"Wheat for the cash crop and corn for the cows and chickens that make the living," is the way one Fallon county farmer epitomizes the agricultural situation.

Diversified Farming Growing

Most of the farms are operated in small units of 160 to 320 acres with spring wheat as the main cash crop and cattle, hogs, poultry and feed crops important factors in the enterprise. Many farmers are developing dairy herds. With the growth of diversified farming, the acreage in corn is increasing, the crop being used for feed, and assuming an important place in the rotations adopted. A Fallon county farmer won sweepstakes on corn at the 1923 show of the Montana Seed Growers' Association.

The Cedar Creek anti-cline runs southeasterly through the county, and in the Cabin Creek district large natural gas wells have been developed, several of which are of considerable size. Drilling for oil is being done. A U. S| Geological Survey report on this field stated that it was not beyond the bounds of reasonable conjecture that "one of the greatest oil fields yet discovered" may be developed on the Cedar Creek anti-cline.

A carbon black plant has been established near Baker which utilizes part of the gas, and it is also piped to Baker, where it is used for domestic and industrial purposes. Fallon county is a part of a coal field that the U. S. Geological Survey states contains 12,000 square miles of merchantable lignite coal, the largest single coal area in the country. The existence of Fuller's earth and kaolin in the county is reported and it is possible that a market for the Fuller's earth can be found at the oil refineries now operating in the state. Ollie, in the northwest corner, is served by a branch line of the Northern Pacific out of Beach, North Dakota.

Biggest Coal Field in Country

Besides the carbon black plant, Baker has a tile and brick yard plant, and a creamery which has fostered dairying.

The Chicago, Milwaukee & St. Paul main line is built east and west through the middle of the county, and is paralleled by the Yellowstone Trail Highway.

Baker, the county seat, is the largest town and a distributing point for a large area to the south of it. Westmore and Plevna are smaller railroad towns. Trading points are found in the interior.

FALLON COUNTY—Ranks fortieth in population (4,548); thirty-ninth in area (1,029,120 acres); thirty-seventh in combined 1922 crop and livestock value; thirty-fourth in 1920 mineral production; thirty-eight in bank deposits, 1922; forty-fourth in assessed valuation, 1922. Acres public land, 26,038; acres state land, 49,015.

WEALTH PRODUCTION—Estimated 1922 crop value, $1,432,200; estimated livestock value, January, 1923, $1,077,800; coal production, 1920 $1,400; total bank deposits, September 15, 1922, $813,855.

TAXATION 1922—Total assessed valuation, $13,575,902; total taxable value, $4,528,873. Total outstanding county bond indebtedness, $681,000; total outstanding county warrant indebtedness, $9,270; total outstanding school bond indebtedness, $66,070; other school debts, $278. Total general and special county taxes, $97,954; total general and district school taxes, $97,023; total municipal taxes, $38,297; total state taxes, $21,606; total tax (inclusive municipal), per capita, $56.04.

EDUCATIONAL—Number graded schools, 66; enrollment, 1,100. Number high schools, 4; enrollment, 154.

BUSINESS STATISTICS—Number of railroads, 2; railway mileage, exclusive spurs and sidetracks, 42.79. Number of manufactures, 8; average number wage earners, 8; value of products, $126,132. Number of banks, 7. Number general stores, 10; confectionery, etc., 7; groceries and meats, 5; lumber yards, 3; total number merchants, 94. Total assessed valuation 1922 merchandise, $173,971. Number grain elevators, 9; total capacity, 240,000 bushels. Number creameries, 1. Number of lawyers, 8. Number of physicians, 4.

AGRICULTURE (1920 census)—Number farms, 758, farm acreage, 576,754; improved farm acreage, 171,815; irrigated acreage, 400 (estimated); average value all property per farm, $14,696. Livestock assessed 1922—number cattle, 13,703; number sheep, 7,362; number horses, 8,974; number swine (census), 1,363.

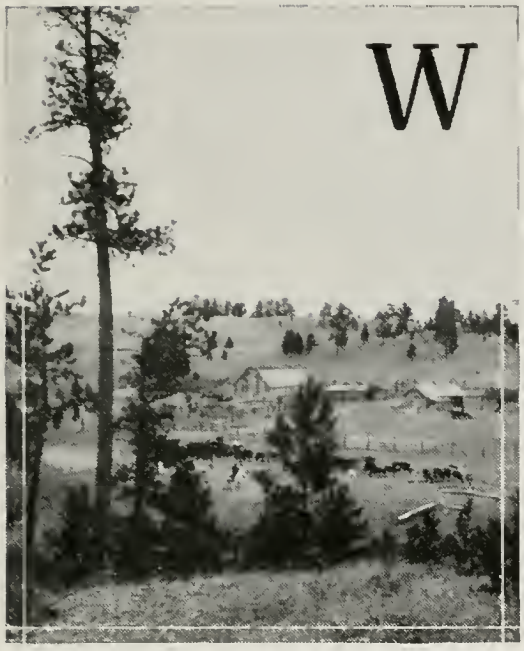
CLIMATOLOGICAL DATA—At Plevna. Elevation, 2,757 feet. Average date last killing frost in spring, May 23; average date first killing frost in fall, September 26.

	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Ave. Prec.	.59	.45	.65	1.12	2.11	2.79	1.90	1.32	1.05	.85	.46	.38	13.67
Ave. Temp.	14.2	15.8	26.2	43.0	52.2	62.8	70.2	66.7	56.4	43.8	32.8	18.9	41.9

County Seat, Baker. Population County Seat, 1,067.
County Agricultural Agent—Yes.

Grinnell Mountain: McDermott Lake.

POWDER RIVER COUNTY



WHILE stock raising will probably remain the leading industry until a railroad taps the region and removes the present transportation handicap, farmers in Powder River county are making good progress, considering the limitations under which they operate, and are laying the foundations of a diversified system which will influence future agricultural development. There are large coal measures in the county, good stands of timber, and the existence of a high quality of glass-making sand is reported.

Powder River county lies in southeastern Montana and is about 50 miles square. The Montana-Wyoming boundary defines its southern boundary. The northern and eastern districts are largely composed of rolling prairie land with pine and cedar brakes. A low range of timbered mountains and the Custer National Forest occupy a considerable area of the western part of the county, and this district will always be best adapted to stock growing. Otter Creek runs in a northerly direction near the western boundary; Powder River flows diagonally from the southwestern corner to the northeastern corner, and the Little Powder River bisects the southeastern quarter of the county. The Mizpah River and Pumpkin Creek rise in the county and flow north.

Noted Stock Region

This region was one of the first to be settled after eastern Montana ceased to be Indian country and for many years was one of the most noted range cattle districts in the west. While not conducted on the same scale as formerly, stock growing continues to be the dominant industry. During the past 15 years many homesteaders have come in. In the past few years there has been a pronounced movement to concentrate on crops of relatively small bulk and high value, thus partly overcoming the long haul to the railroad. The acreage devoted to alfalfa seed, popcorn and beans is increasing. Spring wheat is the chief crop, but the acreage in corn for both feed and grain is rapidly expanding, the long, hot growing season making the crop particularly adapted to the district. Vegetables and melons do well, and on the river and creek bottoms alfalfa is successfully raised without irrigation. The Little Powder valley is the largest producer of alfalfa seed.

The coal resources are extensive, occupying the western three-fourths of the county. Most of it is lignite but some approaches the sub-bituminous in quality, and is found in beds ranging from 9 to 95 feet in thickness. Investigations have been made with a view of tapping this field for fuel for mining in the Black Hills of South Dakota. There were only two counties on the eastern side of the Rocky Mountains whose timber cut in 1921 exceeded that of Powder River.

Passenger stages operate daily between Broadus and Miles City. Tri-weekly stages are operated between Broadus and Arvada, Wyoming, on the Burlington. Surveys have been made for a railroad from Belle Fourche, South Dakota, to Miles City that would serve the eastern half of the county. The new north and south railroad now being built from Casper, Wyoming, down the Tongue River to Miles City will pass within a few miles of the western border, reducing by more than half the present distance to the railroad.

Broadus, the county seat, is the largest town and principal trading center. Biddle, in the southeastern corner, and Powderville, in the northeastern, are trading points.

Historically, the Powder River region is one of the most interesting in the state, dating from the time of the early fur traders, through the Indian era, down to the time when the Texas trail herds came down the Powder River into Montana.

POWDER RIVER COUNTY—Ranks forty-ninth in population (3,357); sixteenth in area (2,135,680 acres); twenty-second in combined 1922 crop and livestock value; fifty-second bank deposits, 1922; fifty-first in assessed valuation 1922. Acres public land, 225,727; acres state land, 134,561; acres national forests, 332,510.

WEALTH PRODUCTION—Estimated 1922 crop value, $734,500; estimated livestock value, January, 1923, $2,762,000; 1921 lumber cut, 568 M. feet; total bank deposits, September 15, 1922, $156,362.

TAXATION 1922—Total assessed valuation, $9,464,668; total taxable value, $2,951,777. Total outstanding county bond indebtedness, $77,000; total outstanding county warrant indebtedness, $12,829; total outstanding school bond indebtedness, $53,775. Total general and special county taxes, $90,197; total general and district school taxes, $67,420; total municipal taxes, $646; total state taxes, $15,881; total tax (inclusive municipal), per capita, $51.87.

EDUCATIONAL—Number graded schools, 59; enrollment, 794. Number high schools, 1; enrollment, 33.

BUSINESS STATISTICS—Number of manufacturers, 4; average number wage earners, 4; value of products, $30,654. Number of banks, 2. Number of general stores, 12; confectionery, etc., 1; groceries and meats, 1; lumber yards, 1; total number merchants, 22. Total assessed valuation 1922 merchandise, $34,444. Number flour mills, 1. Number saw mills, 6. Number of lawyers, 3. Number of physicians, 1.

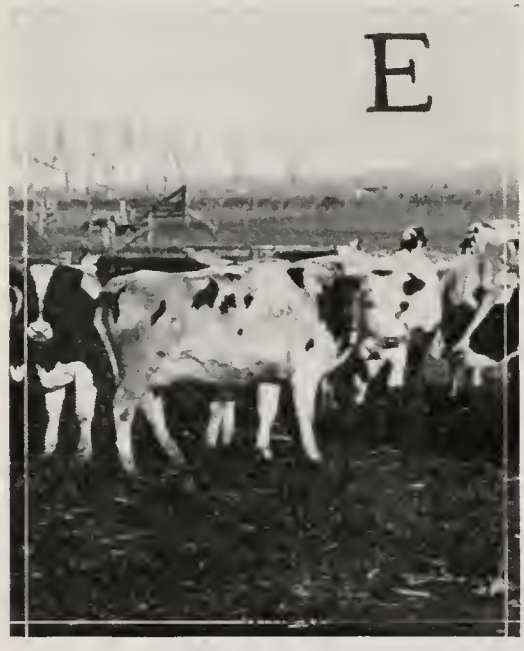
AGRICULTURE (1920 census)—Number farms, 833; farm acreage, 597,056; improved farm acreage, 75,240; irrigated acreage, 800; average value all property, per farm, $13,767. Livestock assessed 1922—number cattle, 45,725; number sheep, 27,112; number horses, 12,401; number swine (census), 1,961.

CLIMATOLOGICAL DATA—At Biddle. Elevation, 3,050 feet—Broadus. Average date last killing frost in spring, May 23; average date first killing frost in fall, September 18.

	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Aver. Prec.	.47	.34	.50	1.27	2.58	2.76	1.97	1.57	1.55	.90	.39	.33	14.63
Aver. Temp.	18.5	22.3	31.2	41.1	52.9	63.4	70.0	67.3	58.5	45.9	32.7	23.0	43.9

County Seat, Broadus. Population County Seat, 363.
County Agricultural Agent—No.

CUSTER COUNTY



EMBRACING at one time the eastern half of Montana and heralded from Texas to Canada as the stockman's empire, the march of progress has vastly decreased the area of Custer county and brought many changes to its people, but it is still very much on the map. The Custer county cry of "Powder River—let 'er buck!" became the slogan of the American Expeditionary Forces. A new north and south railroad is expected to be in operation in 1924 between Miles City and Casper, Wyoming, giving Custer county and southeastern Montana rail facilities that long have been needed, and eastern Montana a direct rail connection with Denver. While stock raising is the most important industry, more attention is being given farming, and plans are under way for the irrigation of many additional acres of land. Custer county lies in southwestern Montana, 60 miles in length north and south and 50 miles in width east and west. Much of its area is broken, rolling land especially adapted for grazing. The higher uplands between the river valleys—the Yellowstone, the Tongue and the Powder Rivers—are adapted to non-irrigated farming. There is considerable variation of soil types, ranging

from sandy loam to clay and heavy clay loams, the latter predominating in the valleys, with the lighter soil types for the most part in the uplands.

Stock Raising Chief Industry

Naturally adapted to stock raising, this industry from the beginning has been the county's most important business and, while it probably will continue to be important, in recent years there has been a marked growth in farming. The uplands are generally devoted to a non-irrigated system of diversified farming, and the irrigated valleys to alfalfa, cereal grains and some truck crops and sugar beets. Spring wheat is the chief cash crop. An increasing acreage is being devoted to corn, the seasonal conditions being particularly favorable for it. Corn is stimulating the swine industry. Climatic conditions are most favorable to alfalfa. Both hay and seed are produced, and in high grade seed production the county ranks among the leaders. There is an increasing interest in dairying. A co-operative livestock shipping association has been organized.

While there were about 9,000 acres of land irrigated when the census was taken, it is estimated 14,000 acres are watered. It is hoped to start construction in 1924 on the Buffalo Rapids project near Miles City, for the reclamation of 125,000 acres of Yellowstone valley land in Custer, Rosebud and Dawson counties. The plans contemplate a hydro-electric project on the Yellowstone River developing 17,500 horse power which will be used in pumping at a cost of about $2.50 an acre a season. The estimated cost is $2,000,000.

The largest industrial enterprise is the Milwaukee repair shops at Miles City. Custom-made stock saddles from Miles City establishments have found a market throughout the western United States and the stock-growing districts of South America. Other industries include an oil refinery and a large creamery.

The county is underlain by beds of lignite coal. Sandstone is abundant. There has been some exploration for oil.

A New Railroad

The main lines of the Northern Pacific and the Chicago, Milwaukee and St. Paul follow the Yellowstone River southwesterly through the northern part of the county. The new north and south railroad to Wyoming goes southwesterly up Tongue River. Two main east and west automobile highways parallel the Yellowstone and there are secondary highways running south from Miles City into South Dakota and Wyoming.

In the south end of the county large cattle ranches, conducted much the same as in frontier range days, are to be found. The Snow Creek Game Preserve, created through the efforts of W. T. Hornaday of the New York Zoological Society, can best be reached from Miles City. Annually, that city stages a frontier rodeo and wild west show.

Miles City, the county seat, is the largest city in southeastern Montana, and a jobbing center for a large area. Operation of the new railroad will enhance its importance. It is a modern and up-to-date community. For many years it was the largest primary horse market in the world. Trading points in the farming and stock-growing districts include Ismay, Kinsey, Beebe, Shirley, Ulmer and Calabar.

CUSTER COUNTY—Ranks twelfth in population (12,194); eleventh in area (2,394,240 acres); thirty-sixth in combined 1922 crop and livestock value; twenty-second in 1920 mineral production; ninth in bank deposits, 1922; thirteenth in assessed valuation, 1922. Acres public land, 136,154; acres state land, 125,955; acres military reservations, 51,840.

WEALTH PRODUCTION—Estimated 1922 crop value, $717,700; estimated livestock value, January, 1923, $1,864,000; coal production, 1920, $18,000; total bank deposits, September 15, 1922, $4,339,845.

TAXATION 1922—Total assessed valuation, $29,454,892; total taxable value, $9,784,948. Total outstanding county bond indebtedness, $615,000; total outstanding county warrant indebtedness, $7,744; total outstanding school bond indebtedness, $511,028; total general and special county taxes, $279,959; total general and district school taxes, $269,477; total municipal taxes, $111,757; total state taxes, $46,420; total tax (inclusive municipal), per capita, $58.03.

EDUCATIONAL—Number graded schools, 60; enrollment, 1,975. Number high schools, 1; enrollment, 478. Other institutions, State Industrial School for Boys, Miles City.

BUSINESS STATISTICS—Number of railroads, 2; railway mileage, exclusive spurs and sidetracks, 90.89. Number of manufactures, 19; average number wage earners, 682; value of products, $2,209,804. Number of banks, 6. Number general stores, 10; confectionery, etc., 11; groceries and meats, 27; lumber yards, 7; total number merchants, 203. Total assessed valuation 1922 merchandise, $1,429,542. Number grain elevators, 5; total capacity, 135,000 bushels. Number creameries, 1. Number flour mills, 1. Number of lawyers, 23. Number of physicians, 10.

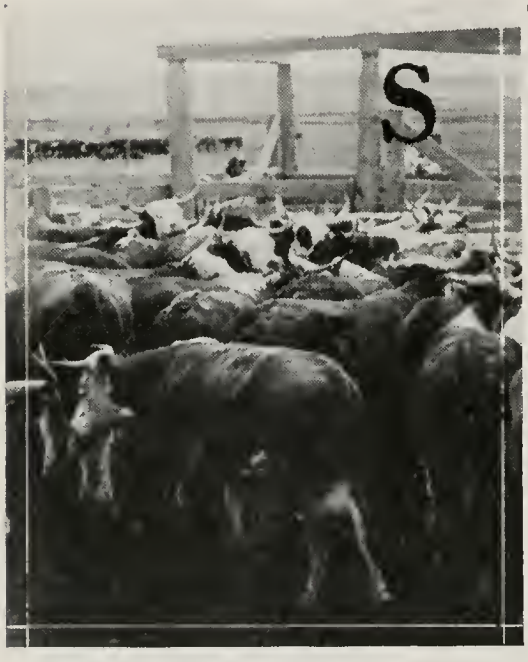
AGRICULTURE (1920 census)—Number farms, 941; farm acreage, 997,169; improved farm acreage, 121,688; irrigated acreage, 8,469; average value all property, per farm, $16,143. Livestock assessed 1922—Number cattle, 25,779; number sheep, 27,820; number horses, 11,926; number swine (census), 1,947.

CLIMATOLOGICAL DATA—At Miles City. Elevation, 2,378 feet. Average date last killing frost in spring, May 5; average date first killing frost in fall, October 2.

	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Ave. Prec.	.65	.51	.90	1.02	2.16	2.83	1.58	1.06	.94	.85	.55	.50	13.55
Ave. Temp.	15.3	16.9	31.1	46.6	56.7	66.4	73.6	71.7	60.1	47.4	32.9	21.6	45.

County Seat, Miles City. Population County Seat, 7,937.
County Agricultural Agent—Yes.

ROSEBUD COUNTY



STOCK growing is the leading industry in Rosebud county, but diversified farming is expanding, and 1924 will witness an industrial development of considerable magnitude when the Northern Pacific Railway Company starts coal mining in the southern part of the county. A railway 30 miles in length will be completed before the close of 1923 to tap the coal district. The North and South Railway between Miles City and Casper, Wyoming, now under construction, follows the Tongue River for 60 miles through the southeastern part of the county, giving it a long-needed outlet.

Rosebud county lies in southeastern Montana. From the Musselshell River, which defines two-thirds of its western boundary, it extends eastward about 85 miles. Its southern boundary lacks 12 miles of meeting the Montana-Wyoming line. It is about 115 miles in length, north and south. Midway, the Yellowstone river flows east and west across the county, receiving from both the northern and southern parts of the county the drainage of some smaller streams. Parts of the Northern Cheyenne Indian reservation and of the Custer National Forest occupy practically the entire area of the extreme southern district.

Alfalfa Seed and Melons

Farming south of the Yellowstone valley is subordinate to the livestock industry, with hay as the principal crop, which provides winter forage for the large number of sheep and cattle that are run on the range basis. Alfalfa seed production in this part of the county is expanding. The region north of the Yellowstone valley is devoted to non-irrigated farming and stock raising. In the northern part of the county a heavy clay type of soil predominates. In other districts the soil types range from sandy to clay loams. In addition to the acreage at present irrigated along the Yellowstone River, it is estimated 35,000 acres are irrigable.

Spring wheat, corn, rye and flax are the principal crops in the non-irrigated districts, and hay, corn, oats and wheat in the irrigated districts. Corn has done well on both the irrigated and non-irrigated farms. Besides stimulating the swine industry it is directing attention to the possibilities of fattening sheep and cattle, thus expanding the winter feeding operations which have been extensively carried on in the alfalfa districts of the Yellowstone valley. Diversification in other lines is taking place. Considerable alfalfa seed is raised along creek bottoms in some of the non-irrigated districts. The growing of watermelons which reach the market when there is little competition from other regions is another development in the non-irrigated districts. In 1923 a small acreage was contracted in the irrigated districts for watermelon and cucumber seed, 25,000 pounds of which were exported to Holland and France. Northern-grown melon seed is reported to be in good demand in the states to the south.

Large Coal Measures

The opportunity presented in Rosebud county for strip mining coal will result in the establishment of a new industry. According to the report of the Northern Pacific to the Interstate Commerce Commission, geologists examined 946 square miles of land in Rosebud county and reported the existence of 11,550,000,000 tons of coal, with indications that the coal extended southward over a much greater area. The report stated the Northern Pacific coal mining operations would cover an area of 15 square miles and it was expected to produce an output of 1,400,000 tons of coal a year, to be used on its system between Mandan and Missoula. While the coal is of lower grade than that now used, it can be mined for 65 cents a ton, and test runs indicate it to be a satisfactory locomotive fuel. Soapstone and brick clay are also found in the county. Drilling has been done for oil on the Porcupine Dome, one of the largest potential oil domes in the state, which starts four miles north of Vananda.

The main lines of the Northern Pacific and of the Chicago, Milwaukee & St. Paul Railway traverse the county through the Yellowstone valley, the Milwaukee swinging through the northwestern quarter. The Northern Pacific branch to the new coal mines follows Armells Creeks south from the Yellowstone.

Forsyth, near the geographical center, is the county seat and the largest town. It has all modern municipal improvements. Rosebud, in the eastern half of the county, is the second largest community and in the center of a good agricultural district. Vananda, Ingomar and Sumatra, on the Milwaukee, are shipping points. There is a shearing plant at Ingomar with a capacity of 6,000 sheep daily. Vananda serves an extensive corn district.

Rosebud county lies in the heart of the old buffalo and Indian region. It is reported that 75,000 buffalo were killed in this part of the Yellowstone valley in 1881. The council of war held June 21, 1876, by Generals Custer, Terry and Gibbons on the steamer Far West at the confluence of the Yellowstone and the Rosebud, in what is now this county, broke the Indian power in the northwest. The following day Custer's command rode to its death up the Rosebud. General Miles fought the Indians at Lame Deer, and on the Rosebud occurred the fight with Crazy Horse. The Tongue River trail, first used by Indians and fur traders and then by soldiers, became a memory with the passing of the southern trail herds.

ROSEBUD COUNTY—Ranks twenty-fifth in population (8,002); sixth in area (3,195,520 acres); nineteenth in combined 1922 crop and livestock value; twenty-third in bank deposits, 1922; fourteenth in assessed valuation, 1922. Acres public land, 129,292; acres state land, 167,224; acres national forests, 96,759; acres Indian reservations (all unallotted), 232,243.

WEALTH PRODUCTION—Estimated 1922 crop value, $1,431,300; estimated livestock value, January, 1923, $2,340,000; 1921 lumber cut, 444 M feet; total bank deposits, September 15, 1922, $1,426,988.

TAXATION 1922—Total assessed valuation, $27,683,517; total taxable value, $10,615,813. Total outstanding county bond indebtedness, $656,000; total outstanding county warrant indebtedness, $47,360; total outstanding school bond indebtedness, $278,560; other school debts, $94,712. Total general and special county taxes, $400,970; total general and district school taxes, $232,187; total municipal taxes, $48,632; total state taxes, $50,285; total tax (inclusive municipal), per capita, $91.48.

EDUCATIONAL—Number graded schools, 77; enrollment, 1,438. Number high schools, 8; enrollment, 264.

BUSINESS STATISTICS—Number of railroads, 2; railway mileage, exclusive spurs and sidetracks, 136.53. Number of manufactures, 15; average number wage earners, 63; value of products, $778,996. Number of banks, 8. Number general stores, 18; confectionery, etc., 3; groceries and meats, 12; lumber yards, 7; total number merchants, 135. Total assessed valuation 1922 merchandise, $397,182. Number grain elevators, 10; total capacity, 186,000 bushels. Number flour mills, 2. Number saw mills, 6. Number of lawyers, 16. Number of physicians, 8.

AGRICULTURE (1920 census)—Number farms, 1,136; farm acreage, 1,608,235; improved farm acreage, 226,113; irrigated acreage, 20,814; average value all property, per farm, $20,815. Livestock assessed 1922—number cattle, 25,066; number sheep, 87,738; number horses, 9,256; number swine (census), 3,368.

CLIMATOLOGICAL DATA—At Forsyth. Elevation, 2,515 feet. Average date last killing frost in spring, May 19; average date first killing frost in fall, September 22.

	No. Yrs. Record	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Ave. Prec.	7	.73	.39	.56	.68	2.89	2.4	1.65	.64	1.78	.89	.59	.32	13.52
Mean Temp.	9	15.2	18.3	33.6	47.7	54.4	64.9	71.7	71.4	60.4	47.5	36.4	24.9	45.5

County Seat, Forsyth. Population County Seat, 1,838.
County Agricultural Agent—Yes.

TREASURE COUNTY

ONE of the smallest counties of the state in area and population, Treasure, is just beginning to develop its agricultural possibilities, particularly on irrigated lands. Livestock raising is the most important industry, and certain portions of the county will always be best adapted to it, but with the general establishment of a diversified system, farming will take the lead.

Treasure county lies in south central Montana, about 36 miles in length, north and south and 24 miles in width. The Wolf Mountains define its eastern boundary south of the Yellowstone River, and it stretches westward to the confluence of the Big Horn and the Yellowstone Rivers. The latter stream flows easterly across the middle of the county, and in its valley lies most of the irrigated land. The 1920 census figures on irrigated land, are not considered representative of the average acreage irrigated, which is estimated at 20,000 to 24,000 acres. Projects are contemplated looking to an enlargement of the area under water. Soil types vary from sandy to clay and heavy clay loam, the latter requiring careful handling, particularly in the irrigated districts, to insure maximum crop returns.

Wheat at present is the principal crop, followed by alfalfa, oats and wild hay. In the irrigated districts sugar beet growing has become established. Yields of 21 tons to the acre have been obtained and average yields are high. The comparatively low elevation and long and hot growing season permit a wide crop range. The production on non-irrigated land of watermelons for commercial purposes is expanding, and cantaloupes, tomatoes and other vegetables do well. Corn is working into the crop rotation, particularly in the non-irrigated districts,

furnishing forage for cattle and grain for hogs. Considerable alfalfa seed is being raised, the Sarpy Creek district in the southeastern part of the county being the chief producer. Bee-keeping is growing.

Coal is found in some districts. One vein on Box Elder Creek, five miles south of Hysham, has been opened to provide fuel for local consumption. The existence of a large deposit of bentonite, five miles long and up to a mile wide, 10 to 30 feet in thickess, is reported six miles northwest of Hysham.

The main line of the Northern Pacific follows the Yellowstone valley and is paralleled by the main east and west highways. Trade from the northern part of the county finds its nearest rail outlet through the Chicago, Milwaukee & St. Paul on the north.

Hysham, the only incorporated town, is the county seat. It has modern municipal improvements. Sanders, Myers, Rancher and Big Horn are shipping points. Big Horn serves a district along the Big Horn River and Tullock Creek, as well as in the Yellowstone valley.

Historically, Treasure county is one of the most interesting parts of the state. Here, on the south side of the Yellowstone and the east side of the Big Horn Rivers, in 1807, Manuel Lisa erected the first trading post on the upper rivers of the northwest and the first building in what is now Montana. Other posts followed—Fort Benton, Ashley-Henry post, Fort Sarpy and Fort Cass, but scarcely their memory remains today. There was a revival, in 1875, almost at the same place, of the dream of empire conceived by Lisa in 1807. Fort Pease was built on Pease Bottoms, near the present station of Myers, considered the head of navigation on the Yellowstone, with the intention of wresting from Fort Benton the trade of the gold mines. The post was immediately invested by the Sioux. Many of its defenders were killed or wounded. Finally one man volunteered to seek help. In the dead of winter he made his way to Fort Ellis, 175 miles westward. In March of 1876 four troops of cavalry appeared and relieved the emaciated garrison.

TREASURE COUNTY—Ranks fifty-fifth in population (1,990); fiftieth in area (614,400 acres); forty-eighth in combined 1922 crop and livestock value; forty-ninth in bank deposits, 1922; fifty-fourth in assessed valuation, 1922. Acres public land, 6,561; acres state land, 35,628.

WEALTH PRODUCTION—Estimated 1922 crop value, $489,100; estimated livestock value, January, 1923, $637,900; 1921 lumber cut, 35 M feet; total bank deposits, September 15, 1922, $265,348.

TAXATION 1922—Total assessed valuation, $6,849,088; total taxable value, $2,220,005. Total outstanding county bond indebtedness, $85,000; total outstanding county warrant indebtedness, $102; total outstanding school bond indebtedness, $98,551; other school debts, $17,765. Total general and special county taxes, $94,734; total general and district school taxes, $53,183; total municipal taxes, $10,686; total state taxes, $10,800; total tax (inclusive municipal), per capita, $85.12.

EDUCATIONAL—Number graded schools, 19; enrollment, 465. Number high schools, 4; enrollment, 72.

BUSINESS STATISTICS—Number of railroads, 1; railway mileage, exclusive spurs and sidetracks, 27.88. Number of manufactures, *. Number of banks, 2. Number general stores, 4; groceries and meats, 1; lumber yards, 1; total number merchants, 24. Total assessed valuation 1922 merchandise, $71,307. Number grain elevators, 2; total capacity, 8,000 bushels. Number saw mills, 2. Number of lawyers, 3. Number of physicians 3.

AGRICULTURE (1920 census)—Number farms, 330; farm acreage, 237,133; improved farm acreage, 44,933; irrigated acreage, 7,788; average value all property, per farm, $14,158. Livestock assessed 1922—number cattle, 7,814; number sheep, 13,843; number horses, 2,800; number swine (census), 1,196.

No climatological data. See Forsyth, Rosebud County.

County Seat, Hysham. Elevation, 2,667 feet. Population County Seat, 360.

County Agricultural Agent—No.

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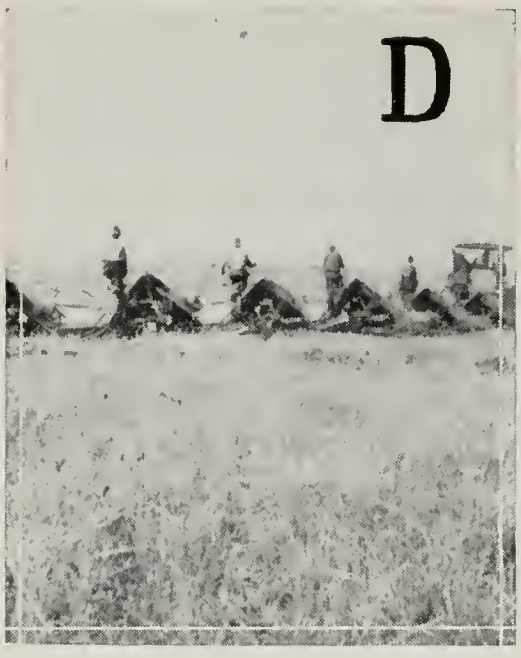
*Statistics on the number of manufactures, average number wage earners and the value of products are not available, the 1920 census grouping Lewis and Clark, Deer Lodge and Treasure counties together so as not to disclose the operations of individual establishments.

BIG HORN COUNTY



DEVELOPMENT in Big Horn county up to the present has been confined chiefly to its fertile agricultural areas, which probably will always be its principal resource, but it has others of much industrial importance. These include petroleum, large coal measures, the largest known gypsum deposits in Montana, and an undeveloped hydro-electric site on the Big Horn River of approximately 100,000 horse power. It is the second largest sugar beet district in the state. The principal operations of the largest farming corporation in the world are conducted in this county. About two-thirds of the area of the county is included in Indian reservations. Much of this Indian land is available for purchase, and much is leased, the grazing land principally in large tracts to stockmen. It is expected the allotment of the reservation lands will be completed in 1923 and 1,596,942 acres distributed among 1,768 Indians of whom 121 will receive title in fee simple. Trust patents will be given the others, preventing them from disposing of their holdings without the consent of the Indian department.

Large Valleys and Broad Benches

Big Horn county lies in southeastern Montana, its southern boundary adjoining Wyoming. Isolated mountain ranges rise near both the eastern and western boundaries, but most of the surface is level or rolling, with broad bench uplands. The valley of the Big Horn, approximately 75 miles in length and averaging from 20 to 25 miles miles in width, is the principal agricultural district, though there are a number of other fertile smaller valleys. Soil types are fairly uniform and on the rolling benches extending down from the Big Horn mountains, soils are very fertile. In some of the irrigated districts the bottom lands are heavy clay types which require careful handling to secure the best crop results. It is well watered by the Big Horn, which is one of the largest rivers in the state, and by its numerous tributaries.

In the reservation section of the county, considerable farming is carried on by companies leasing large acreages and subleasing smaller units to farmers. In the northern part both irrigated and non-irrigated farming is practiced, the former being confined to the valley along the Big Horn River, and the latter to the bench lands sloping away to the east and west. Both winter and spring wheat are generally grown with good results. Other small grains produce well, and in the irrigated districts sugar beets are taking a prominent place in crop production. In 1922, 343 cars of sugar beets were shipped. Near Hardin and on the irrigated valley lands many farms have apiaries, and honey is rapidly becoming an important product Corn may be grown in all districts but does especially well in the lower valleys which have a hotter growing season than is found on the uplands. Large cattle outfits operate on leased Indian lands in the southern part of the county. There is a co-operative livestock shipping association with headquarters at Hardin.

Coal, Gypsum and Oil

The only mineral resource which has been developed is oil. On Soap Creek, 40 miles southwest of Hardin, six producing wells have been drilled. No transportation facilities are available and the wells are capped. Drilling is also under way on Woody Creek, 20 miles south and west of Hardin. Conisderable coal exists and big deposits of gypsum.

The Burlington railroad runs northerly through the central portion of the county to Hardin and then turns northwest. A 12-mile branch line has been built north of Hardin down the Big Horn valley, and a 40-mile road up the valley is projected. The northeastern part of the county will be served by a branch line the Northern Pacific is building, in Rosebud county.

Hardin, with all modern improvements, situated near the center of the county, is the largest town and the chief trading and distributing point. Other towns are Crow Agency, Lodge Grass and Wyola.

The most famous Indian battlefield in the United States, where Custer's command was annihilated by the Sioux in 1876, is in this county. It was in this region that the first Montana fur traders were established. The Big Hole canyon, a narrow gorge 50 miles long with bare walls of rock rising to heights of 1,500 feet, is worth seeing. At many places the vivid coloring of the canyon walls is beautiful and the view from the top is of appealing grandeur. The Bonneville expedition of 1831-1833 is credited with being the first party to explore the Big Horn, which they followed from Wyoming down to its mouth and then down the Yellowstone.

BIG HORN COUNTY—Ranks thirtieth in population (7,015); fifth in area (3,178,240 acres); thirteenth in combined 1922 crop and livestock value; thirty-sixth in bank deposits, 1922; thirty-first in assessed valuation, 1922. Acres public land, 26,945; acres state land, 64,307; acres Indian reservations (most of it allotted but held in trust), 2,301,849.

WEALTH PRODUCTION—Estimated 1922 crop value, $1,457,200; estimated livestock value, January, 1923, $2,518,000; 1921 lumber cut, 427 M feet; total bank deposits, September 15, 1922, $870,424.

TAXATION 1922—Total assessed valuation, $19,790,125; total taxable value, $6,460,174. Total outstanding county bond indebtedness, $379,000; total outstanding county warrant indebtedness, $9,443; total outstanding school bond indebtedness, $252,000; other school debts, $7,296. Total general and special county taxes, $111,970; total general and district school taxes, $156,269; total municipal taxes, $17,507; total state taxes, $31,660; total tax (inclusive municipal), per capita, $45.24.

EDUCATIONAL—Number graded schools, 47; enrollment, 1,464. Number high schools, 4; enrollment, 183.

BUSINESS STATISTICS—Number of railroads, 1; railway mileage, exclusive spurs and sidetracks, 82.98. Number of manufactures, 22; average number wage earners, 22; value of products, $148,733. Number of banks, 5. Number general stores, 20; confectionery, etc., 4; groceries and meats, 18; lumber yards, 6; total number merchants, 147. Total assessed valuation 1922 merchandise, $461,157. Number grain elevators, 5; total capacity, 115,000 bushels. Number creameries, 1. Number flour mills, 1. Number saw mills, 5. Number of lawyers, 9. Number of physicians, 8.

AGRICULTURE (1920 census)—Number farms, 791; farm acreage, 748,749; improved farm acreage, 158,363; irrigated acreage, 48,306; average value all property, per farm, $22,949. Livestock assessed 1922—number cattle, 43,573; number sheep, 13,180; number horses, 7,427; number swine (census), 2,885.

CLIMATOLOGICAL DATA—At Crow Agency. Elevation, 3,041 feet. Average date last killing frost in spring, May 14; average date first killing frost in fall, September 26.

	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Ave. Prec.	.78	.62	.92	1.33	2.5	2.65	1.26	.89	1.03	1.23	.79	.70	14.70
Ave. Temp.	18.6	20.2	32.6	46.4	56.7	65.0	71.2	69.1	58.7	47.1	33.3	24.5	45.3

County Seat, Hardin. Population County Seat, 1,312.
County Agricultural Agent—No.

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SOUTH CENTRAL MONTANA

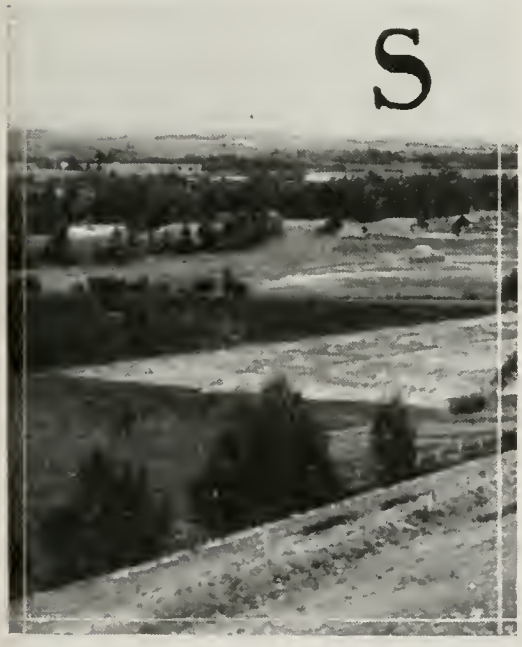
Combines Characteristics of Both the Eastern Slope and Plains Regions—Includes Two of the Best Known Agricultural Districts—Tourist Attractions and Minerals.

The northeastern part of the South Central district, which is composed of Yellowstone, Carbon, Stillwater, Sweet Grass, Park and Gallatin counties, partakes of the characteristics of the plains region of Montana, while the western and southern parts partake of the characteristics of the eastern slope or mountain region. The best known agricultural districts are the Yellowstone and the Gallatin valleys where farming has been long followed and where diversification has been well established. Both irrigated and non-irrigated methods are followed. The district leads the state in alfalfa and sugar beets; it ranks second in coal production; is an important producer of livestock; and in the southwestern part contains varied mineral resources which include one of the largest deposits of chrome ore in the United States, and considerable undeveloped waterpower. It contains many tourist attractions. The northern, or Gardiner entrance to the Yellowstone park, is within its borders.

The growing season ranges from 135 days in the eastern part to 110 days in the western. The agricultural areas range in elevation from 3,000 to 5,000 feet, but in the high mountains in the southern part are found the highest elevations in the state. Granite Peak, 12,850 feet, is the highest named pinnacle.

Three of the larger cities of the state are in the district.

CARBON COUNTY



SUGAR beets, fruit and honey in the lower valleys; livestock in the upper valleys and on the foothills; then coal; in the high mountain regions, glaciers, scenery and tourists—this is Carbon county. Its chief industry is coal mining. In value of coal product it is easily the foremost county in the state. For variety and grandeur of scenery and excellence of hunting and fishing few regions equal it and none surpass it. The first producing oil wells in the state were found here. It has many undeveloped mineral resources.

Situated in south central Montana, the Yellowstone River marking its northern boundary, Carbon county rises from an approximate elevation of 3,300 feet to more than 13,000 feet in the Beartooth mountains near the Wyoming boundary. Granite peak, the highest named mountain in the state, with an elevation of 12,850 feet, is in Carbon county, but there are several unnamed peaks in the same

range that are above 13,000 feet, according to the United States Geological Survey. The well-watered valleys, running north and south, widen out in the northern part of the county and the mountains give way to rolling benchlands. The soil in the valleys is a deep alluvial loam; on the benchlands it is a chocolate-colored loam.

Much Irrigated Land

In irrigated acreage, this county is one of the leaders. Construction has started on a project to reclaim an additional 32,000 acres and other projects are contemplated or under way for the irrigation of another 20,000 acres. More than half of the farms are irrigated. Spring wheat is the primary grain crop and alfalfa the leading feed crop. A considerable irrigated acreage is devoted to sugar beets, fruit and vegetables. Honey is an important product. Small grains return good yields in the non-irrigated areas. Corn is adapted to the lower valleys. Along the foothills near the mountains mixed livestock and grain farming are types generally followed. Many districts, because of good water, green pastures and alfalfa hay, are naturally adapted to dairying, and more attention is being given this industry. Many of the smaller farms are developing good herds of pure-bred swine.

About a fourth of the area of the county is included within national forests. Lumbering operations are conducted on a small scale. The high areas within the forests are utilized as summer range by many bands of sheep. Aside from the manufacture of brick, coal and petroleum are the only minerals commercially produced. Petroleum was first produced in this county in 1916 in the Elk Basin field near Wyoming, but the output is declining. Red Lodge, Bear Creek and Washoe are the centers of coal production. Other mineral resources include gypsum, chromite, oil shale, natural gas, limestone and sandstone and possibly pottery clay, fire clay and uranium.

The rail and highway transportation facilities are good. The Denver-Billings line of the Burlington runs northerly through the eastern part of the county, down the Clark's Fork, and is paralleled by the Cody-Billings highway; the Northern Pacific has a branch to Red Lodge that serves the middle of the county; and an independent railway serves the Bear Creek district in the south central part. A highway which meets the main east and west highway at Laurel runs north to Red Lodge and is the main route into the Beartooth mountains. It also connects with the Bear Creek coal fields, the Wyoming oil fields and Cody.

Many Tourist Attractions

Red Lodge, modern and the county seat, is the largest town and the principal trading point. It is in the heart of the Beartooth region. Bear Creek and Washoe are coal camps. Fromberg, Bridger, Edgar, Silesia, Boyd, Roberts, Roscoe and Luther are in the agricultural and livestock districts.

Rugged mountains, a titanic plateau on the "roof of the world," beautiful canyons and lakes and a unique glacier—the Grasshopper—named after the millions of insect pests that are embedded in its ice, make the Beartooth region of this county unusually attractive to tourists. A number of summer resorts have been established.

CARBON COUNTY—Ranks tenth in population (15,279); thirty-second in area (1,318,400 acres); twentieth in combined 1922 crop and livestock value; second in 1920 mineral production; thirteenth in bank deposits, 1922; nineteenth in assessed valuation, 1922. Acres public land, 149,322; acres state land, 45,651; acres national forests, 302,190.

WEALTH PRODUCTION—Estimated 1922 crop value, $2,071,900; estimated livestock value, January, 1923, $1,516,000; metal production, 1920, $71; coal production, 1920, $6,071,000; 1921 lumber cut 301 M feet; total bank deposits, September 15, 1922, $3,108,169.

TAXATION 1922—Total assessed valuation, $23,250,930; total taxable value, $8,359,745. Total outstanding county bond indebtedness, $533,000; total outstanding county warrant indebtedness, $103,818; total outstanding school bond indebtedness,

$419,867. Total general and special county taxes, $193,749; total general and district school taxes, $282,825; total municipal taxes, $33,857; total state taxes, $39,434; total tax (inclusive municipal), per capita, $35.98.

EDUCATIONAL—Number graded schools, 65; enrollment, 3,542. Number high schools, 8; enrollment, 528.

BUSINESS STATISTICS—Number of railroads, 3; railway mileage, exclusive spurs and sidetracks, 121.37. Number of manufactures, 47; average number wage earners, 146; value of products, $761,218. Number of banks, 13. Number general stores, 36; confectionery, etc., 17; groceries and meats, 30; lumber yards, 13; total number merchants, 273. Total assessed valuation 1922 merchandise, $620,933. Number grain elevators, 14; total capacity, 383,000. Number creameries, 2. Number flour mills, 1. Number saw mills, 4. Number of lawyers, 11. Number of physicians, 12.

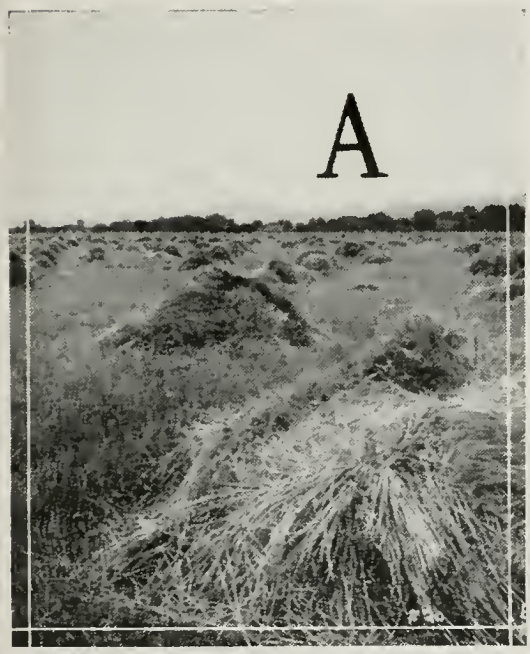
AGRICULTURE (1920 census)—Number farms, 1,353; farm acreage, 446,386; improved farm acreage, 178,503; irrigated acreage, 99,336; average value all property, per farm, $15,454. Livestock assessed 1922—number cattle, 18,672; number sheep, 27,709; number horses, 8,961; number swine (census), 8,707.

CLIMATOLOGICAL DATA—At Bridger. Elevation, 3,664 feet. Average date last killing frost in spring, May 19; average date first killing frost in fall, September 14.

	No. Yrs. Record	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Ave. Prec.	12	.26	.23	.34	.81	1.73	1.44	.62	.65	1.57	1.25	.19	.39	9.48
Mean Temp.	12	20.7	23.9	34.6	45.1	53.4	63.5	68.6	66.5	57.2	45.3	35.5	23.0	44.8

County Seat, Red Lodge Population County Seat, 4,515.
County Agricultural Agent—No.

YELLOWSTONE COUNTY



A FIRMLY established system of diversified farming on well tilled irrigated lands, plus a strategic location for trade distribution in an interstate territory are the primary factors that have given Yellowstone county the third largest population and made Billings the third largest city in the state and the leading city of eastern Montana. The possibilities of the region are beginning to be realized but their development has scarcely begun.

Yellowstone county lies in south central Montana. From the confluence of the Big Horn with the Yellowstone River it extends southwesterly about 74 miles, and from the Bull Mountains on the north it stretches southward about 55 miles. The Yellowstone River flows the entire length, and the fertile valley lands bordering it are practically all under irrigation and in cultivation. Soil types in the valley range from silt clays to heavy clay loam. Non-irrigated farming is the prevailing method on the uplands back of the valley, and a sandy loam the predominating soil type.

Diversification Established

Spring wheat is the principal crop in the non-irrigated districts, but the acreage in corn is rapidly being increased, and a more diversified system of farming is being evolved. Sugar beets, beans, dairying, swine raising and winter feeding of livestock, principally sheep, supplement the production of small grain in the irrigated districts. A number of pure-bred herds of beef and dairy cattle and of hogs have been established a long time. Yellowstone county is the chief producer of sugar beets and beans; it fattens more sheep and cattle for winter and spring markets than any other part of the state, and it has been the pioneer in the movement for the establishment of irrigated pastures which carry two cows to the acre during the growing season. Records of four of the thirty-two cows owned by the United States Department of Agriculture that were placed on official

test were made on roughage alone on irrigated lands at Huntley, and one cow's production was larger when fed roughage alone at Huntley than it was at the government farm in Maryland when she was fed roughage and grain. The use of irrigated pastures is stimulating dairying. Around Billings there is considerable truck gardening. Near Huntley in 1922 one farmer grew white burley tobacco experimentally. It produced at the rate of 2,500 pounds to the acre. The tobacco was five feet tall and the leaves 17 inches across. Yellowstone is one of the leading counties in honey production. Because diversified farming has been further developed in this district than in most other parts of the state, the irrigated farms will average smaller in size, there being many 40, 60 and 80 acre units. Bulletin No. 144 of the Agricultural Experiment Station at Bozeman gives a survey of farming in the irrigated district around Billings.

Coal, brick clay and sandstone are the principal minerals. The Bull Mountain coal field, which extends into Yellowstone from Musselshell county, is one of the largest undeveloped fields in the state, according to the United States Geological Survey.

Billings Serves Big Territory

Rail facilities are excellent and they have made Billings one of the most important jobbing and distributing centers in the state. The main line of the Northern Pacific, east and west, passes through the county. One line of the Burlington from Alliance, Nebraska, and Sheridan, Wyoming, and another from Denver, Cheyenne and Cody, both have their northern terminus at Billings. The Billings-Great Falls-Shelby line of the Great Northern, comes in from the northwest, and is used by Burlington trains to the coast, as is also the Northern Pacific. Twenty passenger trains pass through Billings daily, of which ten are through trains, four are locals and six are branch lines. The most important branch lines are those of the Northern Pacific tapping the coal mining and agricultural districts of Carbon county, and the agricultural district in the Lake Basin region of Yellowstone and Stillwater counties. The interchange of traffic between the three railroads entering Billings totals 50,000,000 tons a year.

The sixth largest sugar beet plant in the world is located at Billings. It also has flour mills, a meat packing plant, creameries, a pickle factory, brick yards, seed houses, wood and metal working establishments, and many other industries. It is the most important point in the state for the distribution of farm machinery and is also one of the principal jobbing centers, not only serving a large territory in Montana, but much of northern Wyoming. While there are no commercial oil wells in the county, many of the larger companies maintain headquarters at Billings, from which the Montana and Wyoming fields are easily reached.

Billings is a well built, thoroughly modern city, as attractive in a residential way as its location has made it important in a business way. It is supplied with natural gas from the Elk Basin field, 72 miles to the south. The Billings Polytechnic Institute, an institution of higher learning, draws students from a wide area. Laurel, west of Billings, is an important railroad town, and the trade center of a well developed agricultural district. Huntley is the chief town on the government reclamation project. Broadview, on the Great Northern, is a shipping point for the non-irrigated district in the northwestern part of the county. There are many smaller communities.

Billings is the gateway from the main lines of travel to the Beartooth region of Carbon county, noted for its scenery, hunting and fishing. The main east and west highways intersect at Billings with the Custer Battlefield highway.

YELLOWSTONE COUNTY—Ranks third in population (29,600); twenty-second in area (1,733,120 acres); eighth in combined 1922 crop and livestock value; fourth in bank deposits, 1922; third in assessed valuation, 1922. Acres public land, 4,082; acres state land, 68,653; acres Indian reservations (most of it allotted), 225,920.

WEALTH PRODUCTION—Estimated 1922 crop value, $3,042,000; estimated livestock value, January, 1923, $2,067,000; 1921 lumber cut, 147 M feet; total bank deposits, September 15, 1922, $7,327,147.

TAXATION 1922—Total assessed valuation, $75,971,311; total taxable value, $23,119,234. Total outstanding county bond indebtedness, $894,000; total outstanding county warrant indebtedness, $12,709; total outstanding school bond indebtedness, $989,442; other school debts, $51,634. Total general and special county taxes, $489,146; total general and district school taxes, $576,465; total municipal taxes, $461,818; total state taxes, $107,608; total tax (inclusive municipal), per capita, $55.23.

EDUCATIONAL—Number graded schools, 99; enrollment, 6,159. Number high schools, 7; enrollment, 1,021. Other institutions, Billings Polytechnic Institute.

BUSINESS STATISTICS—Number of railroads, 4; railways mileage, exclusive spurs and sidetracks, 164,55. Number of manufactures, 105; average number wage earners, 1,184; value of products, $9,064,815. Number of banks, 15. Number general stores, 27; confectionery, etc., 35; groceries and meats, 105; lumber yards, 25; total number merchants, 698. Total assessed valuation 1922 merchandise, $4,562,049. Number grain elevators, 18; total capacity, 536,000 bushels. Number creameries, 5. Number flour mills, 2. Number saw mills, 1. Number of lawyers, 68. Number of physicians, 35. Developed hydro-electric plant capacity, 1,440 horse power.

AGRICULTURE (1920 census)—Number farms, 2,211; farm acreage, 1,067,425; improved farm acreage, 333,174; irrigated acreage, 101,378; average value all property, per farm, $16,474. Livestock assessed 1922—number cattle, 20,375; number sheep, 30,045; number horses, 12,475; number swine (census), 9,566.

CLIMATOLOGICAL DATA—At Billings. Elevation, 3,115 feet. Average date last killing frost in spring, May 16; average date first killing frost in fall, September 26.

	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Ave. Prec.	.68	.40	.80	1.16	2.79	2.37	1.20	.98	1.13	1.21	.80	.44	13.96
Ave. Temp.	22.5	25.0	34.2	47.2	54.8	63.0	70.8	68.9	58.7	48.1	34.7	26.5	46.2

County Seat, Billings. Population County Seat, 15,100.
County Agricultural Agent—Yes.

STILLWATER COUNTY

RESOURCES of Stillwater county are almost as diversified as its elevations, which range from 12,700 feet on Mount Wood, the second highest named peak in the state, to 4,000 feet in the non-irrigated areas of the northern part. Good agricultural and stock-raising districts, natural gas, water power, and among other minerals what is asserted to be the largest deposit of chromite in the United States, and coal are probably the most important assets.

Stillwater county lies in south central Montana. It is about 80 miles in length from the northeast to the southwest, and in width about 25 miles. The Yellowstone River crosses it east and west, about midway of its length. High mountains rise in the southern end. The Stillwater, East and West Rosebud Rivers and Fishtail Creek are the chief streams in the south half of the county. Opportunities exist for the extension of the irrigated lands.

Non-irrigated farming is followed in the northern part of the county, particularly in the Lake Basin district. Soil types here vary from clay loams to sandy loams. Unless carefnl cultural practices are observed with the sandy loams, soil blowing causes tronble. Summer fallow and corn production are generally practiced in the rotation system followed in the non-irrigated districts. There is much irrigated land in the Yellowstone valley. Alfalfa and corn are the principal feed crops. There is a considerable acreage devoted to sugar beets in the eastern part of the county which has developed the winter feeding of stock, especially sheep. Irrigated farming is followed in the mountain and hill valleys south

of the Yellowstone River, and non-irrigated farming on the bench lands. It is asserted there has never been a crop failure in the region south of the Yellowstone. Considerable livestock is raised, the mountainous areas affording good summer pasturage.

Wheat is the principal cash crop, both winter and spring varieties being extensively grown. The county has won many prizes on its small grains. In 1922, at Pendleton, Oregon, it took sweepstakes on both hard red winter and hard spring, and in 1921, at the International Hay and Grain Show at Chicago, in world competition, took first on hard red winter, and a total of seven places on eleven entries.

While coal is the only mineral the county has produced in commercial quantities, there is a deposit of chromite that begins near McLeod, Sweet Grass county, and extends through the south half of Stillwater county as far east as Fishtail Creek, a distance of 27 miles. It is reported to be the largest deposit in the United States. It has only been examined a distance of less than four miles along its course, and, while little development has been done, assays indicated that at least some of it will meet the requirements of steel manufacturers. Near Antelope Point, in the Lake Basin district, large flows of natural gas were discovered while drilling for oil, which is being continued. On the West Fork of the Rosebud River, in the south end of the county, at Mystic Lake, a hydro-electric plant with an initial development of 15,000 horse power is being constructed. Plans call for its completion in 1924. The plant will operate under a head of 700 feet fall, which is greater than is found at any plant in Montana, Idaho, Oregon or Washington.

Big Chromite Deposit

The main line of the Northern Pacific follows the Yellowstone valley through the middle of the county. The north end of the county is tapped by a branch line of the same road that comes in from the east and has its terminus at Rapelje. The main east and west highway follows the Yellowstone River.

Columbus, at the junction of the Yellowstone and Stillwater Rivers, is the largest town, the chief trading center, and the county seat. Park City and Reed Point are trading points on the main line, and Rapelje and Wheat Basin on the branch. Absarokee, on the Stillwater, is a trading point for the southern part of the county.

Majestic scenery is found in the mountains in the southern end, and big game hunting in season. The Lake Basin region draws many duck hunters each fall. Good fishing is found in most of the streams. Historical and scenic attractions include the Bridger trail, the Lewis and Clark trail, Mystic Falls, Woodbine Falls, East Rosebud Lake, Cathedral Peak and Stillwater Palisades.

STILLWATER COUNTY—Ranks twenty-seventh in population (7,630); fortieth in area (1,137,280 acres); twenty-seventh in combined 1922 crop and livestock value; twenty-eighth in 1920 mineral production; twenty-seventh in bank deposits, 1922; thirtieth in assessed valuation, 1922. Acres public land, 16,863; acres state land, 32,464; acres national forests, 86,561.

WEALTH PRODUCTION—Estimated 1922 crop value, $1,364,400; estimated livestock value, January, 1923, $1,750,000; coal production, 1920, $7,304; 1921 lumber cut, 122 M feet; total bank deposits, September 15, 1922, $1,216,762.

TAXATION 1922—Total assessed valuation, $19,961,750; total taxable value, $6,620,390. Total outstanding county bond indebtedness, $742,500; total outstanding county warrant indebtedness, $1,631; total outstanding school bond indebtedness, $278,471; other school debts, $13,300. Total general and special county taxes, $202,757; total general and district school taxes, $166,340; total municipal taxes, $20,239; total state taxes, $30,306; total tax (inclusive municipal), per capita, $55.00.

EDUCATIONAL—Number graded schools, 79; enrollment, 1,608. Number high schools, 6; enrollment, 222.

BUSINESS STATISTICS—Number of railroads, 1; railway mileage, exclusive spurs and sidetracks, 66.15. Number of manufactures, 14; average number wage earners, 19; value of products, $93,153. Number of banks, 8. Number general stores, 18; confectionery, etc., 5; groceries and meats, 17; lumber yards, 11; total number merchants, 145. Total assessed valuation 1922 merchandise, $441,056. Number grain elevators, 14; total capacity, 400,000 bushels. Number creameries 1. Number flour mills, 1. Number saw mills, 2. Number of lawyers, 5. Number of physicians, 9. Hydro-electric development completed in 1924, 15,000 horsepower.

AGRICULTURE (1920 census)—Number farms, 1,370; farm acreage, 660,996; im-

proved farm acreage, 278,040; irrigated acreage, 33,039; average value all property, per farm, $16,443. Livestock assessed 1922—number cattle, 21,889; number sheep, 26,195; number horses, 9,526; number swine (census), 5,381.

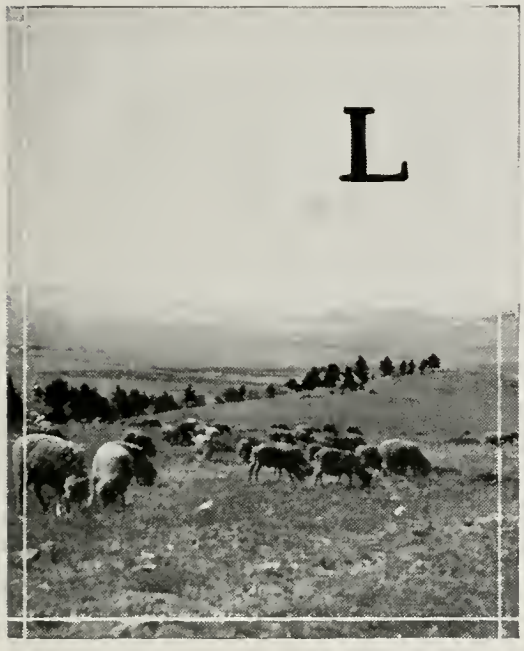
CLIMATOLOGICAL DATA—At Busteed. Elevation, 4,050 feet. Average date last killing frost in spring, May 25; average date first killing frost in fall, September 23.

	No. Yrs. Record	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Ave. Prec.	14	.71	.44	.75	1.21	3.08	2.16	1.46	1.19	1.76	1.34	.66	.50	14.90
Mean Temp.	13	22.2	23.5	32.9	43.1	50.0	59.5	65.8	64.0	54.9	44.5	34.8	26.3	43.5

County Seat, Columbus. Population County Seat, 987.

County Agricultural Agent—Yes.

SWEET GRASS COUNTY



LARGE areas of this county are naturally adapted to livestock raising. While this is by far the most important industry, there are other large areas suitable for farming. Development has proceeded faster than settlement, there being a considerable acreage of irrigated land awaiting colonization and from 25,000 to 40,000 additional acres of land that is irrigable. There has been practically no development of the mineral possibilities.

Sweet Grass county lies in south central Montana. The southern third is occupied by the high and rugged ranges of the Absaroka and Beartooth Mountains. Much of the surface of the northwestern part is covered by the Crazy Mountains, a high, bold isolated range. The surface of the northeastern part is broken by the Cayuse range of hills. These are the chief stock-raising districts and range areas. Both sheep and cattle are carried, the former predominating.

The Yellowstone valley, which midway crosses the county, east and west, and the valleys of the Boulder, Big Timber, Sweet Grass, American Fork and Otter Creeks are the chief agricultural areas. Alfalfa is the principal crop in the irrigated districts, winter feeding of livestock providing a market outlet. Wheat, both winter and spring, is the leading cash crop in the non-irrigated districts of the northern part, and occupies more than double the total acreage of hay, the second leading crop. Oats is in third place. Corn is still in the crop experimental stage but results have been satisfactory. Dairying, bee-keeping and swine raising are indicative of a growing interest in diversification.

Varied Mineral Resources

Chromite is probably the most important mineral resource. A deposit has been traced from McLeod, on the West Fork of the Boulder River, southeasterly across the county into Stillwater county, a distance of 27 miles. The deposit has been examined for less than four miles. Some chromite samples assayed were found to be suitable to the requirements of steel manufacturers. Some coal is found, and Iceland spar. Some exploration work on veins carrying lead-silver ore has been done in the Crazy Mountains but has not been carried far enough to indicate the commercial importance of the prospects.

The main line of the Northern Pacific follows the Yellowstone River. The drainage of the northern end of the county is into the Musselshell River, and much of the traffic follows the water grade to the Milwaukee railroad. Rapelje is the most accessible rail point from the northeastern district. The main east and west highways parallel the railroad.

Big Timber, in the geographical center of the county, is the county seat and largest town and chief distributing point. Considerable irrigated land lying a few miles north of it is awaiting settlement. Melville in the northern, and McLeod in the southern district, are the chief interior points.

Beautiful scenery and fine fishing are found in both the northern and southern mountainous regions. Several dude ranches have been established near the Crazy Mountains.

SWEET GRASS COUNTY—Ranks forty-first in population (4,452); thirty-fourth in area (1,236,480 acres); twenty-sixth in combined 1922 crop and livestock value; thirty-second in bank deposits, 1922; thirty-fifth in assessed valuation, 1922. Acres public land, 25,669; acres state land, 45,133; acres national forests, 389,186.

WEALTH PRODUCTION—Estimated 1922 crop value, $1,042,700; estimated livestock value, January, 1923, $2,135,000; 1921 lumber cut, 575 M feet; total bank deposits, September 15, 1922, $1,038,621.

TAXATION 1922—Total assessed valuation, $17,871,692; total taxable value, $5,685,945. Total outstanding county bond indebtedness, $395,000; total outstanding county warrant indebtedness, $8,057; total outstanding school bond indebtedness, $100,481; other school debts, $3,356. Total general and special county taxes, $104,849; total general and district school taxes, $113,367; total municipal taxes, $21,747; total state taxes, $27,606; total tax (inclusive municipal), per capita, $60.10.

EDUCATIONAL—Number graded schools, 60; enrollment, 923. Number high schools, 1; enrollment 130.

BUSINESS STATISTICS—Number of railroads, 1; railway mileage, exclusive spurs and sidetracks, 37.35. Number of manufactures, 16; average number wage earners, 24; value of products, $135,212. Number of banks, 3. Number general stores, 4; confectionery, etc., 5; groceries and meats, 9; lumber yards, 4; total number merchants, 72. Total assessed valuation, 1922 merchandise, $310,178. Number grain elevators, 4; total capacity, 150,000 bushels. Number creameries, 1. Number flour mills, 2. Number saw mills, 4. Number of lawyers, 8. Number of physicians, 3.

AGRICULTURE (1920 census)*—Number farms, 863; farm acreage, 645,120; improved farm acreage, 138,530; irrigated acreage, 47,306; average value all property, per farm, $22,348. Livestock assessed in 1922—number cattle, 22,425; number sheep, 53,104; number horses, 5,740; number swine (census), 3,869.

CLIMATOLOGICAL DATA—At Big Timber. Elevation, 4,094 feet. Average date last killing frost in spring, May 23; average date first killing frost in fall, September 14.

	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Ave. Prec.	.68	.57	1.03	1.25	3.04	2.24	1.5	1.02	1.75	1.35	.82	.43	15.68
Ave. Temp.	25.6	27.7	33.8	45.0	53.4	62.7	68.6	67.4	57.2	41.1	29.5	28.8	45.1

County Seat, Big Timber. Population County Seat, 1,282.
County Agricultural Agent—No.

*These figures include the territory now in Golden Valley County.

PARK COUNTY

IN PARK county, the livestock and farm wealth of the valleys and lower lands is supplemented by mineral and forest resources and a variety of tourist attractions in the mountains. While stock raising is the leading industry, the county has won a reputation on the quality of its small grains and forage crops. It is one of the most highly mineralized regions in the state and in the past year or two there has been a decided mining revival. Livingston, the county seat, is a division point on the Northern Pacific and is also the gateway to the northern or Gardiner entrance of the Yellowstone Park, which continues to hold its popularity with tourists.

Situated in south central Montana, Park county extends into the Yellowstone Park about three miles. The southern half of the county lies between the Gallatin range of mountains on the west and the Absarokee Mountains on the east. Between them lies the Upper Yellowstone val-

ley frow two to 25 miles wide, which extends in a northerly direction to the middle of the county and then turns east. In the northeastern part of the county are the Crazy Mountains. The Shields River valley occupies the center of the northern half of the county. It is from 15 to 30 miles wide and extends south for a distance of 50 miles where it merges with the Yellowstone. In irrigated acreage Park ranks among the leading ten counties. Considerable additional land can be reclaimed.

Dairying and Stock

Practically all the tillable land in the county is confined to the Yellowstone and Shields River valleys. The growing season in the upper valleys is comparatively short; these areas are better adapted to forage crops and livestock. The proximity of the national forests, which afford summer grazing, accounts, probably, for the fact that livestock production is more important in the county than crop production. On the foothills flanking the valleys non-irrigated farming is followed. On both non-irrigated and irrigated lands the small grains raised are of excellent quality, attested to by the many winnings Park county products have made at national shows. But little corn is raised. Natural conditions well adapt the region to dairying and it is steadily growing in importance. The largest cheese factory in Montana has been successfully operating for a number of years near Wilsall, in the Shields River valley, and at Livingston there are two creameries. There are a number of good-sized pure-bred beef herds in the county and some large stock ranches. Near Livingston is a truck farm whose products are in demand on the fancy markets of St. Paul and Seattle.

Among other minerals which have been produced on a commercial scale in Park county are gold, silver, lead, coal, arsenic, tungsten and brick clay. It also has gypsum, gems, molybdenum and a variety of building and monumental stones. Drilling for oil is under way (1923) in the northern end of the county. Most of the mineral resources are in the southern end of the county. In the Jardine district some low-grade gold properties are being worked, primarily for their arsenical content, the gold being a by-product. The Cooke City district, in the southeastern corner, is considered one of the most promising mining districts in the state, but its inaccessibility has retarded its development. Considerable commercial timber grows on the national forests, which occupy more than a third of the county's area.

The largest industrial activity is found in the railroad shops at Livingston. Granite works, a brick plant, a lime kiln and other industries are also established.

Park county has excellent transportation facilities. The main line of the Northern Pacific goes east and west through the middle of the county, and at Livingston, in the geographical center of the county, a branch runs north up the Shields valley to Wilsall and another south up the Yellowstone to the Yellowstone Park. A main east and west highway crosses the county and the western Park to Park route from Gardiner to Glacier station traverses the county north and south.

Livingston, the county seat, is one of the larger cities of the state. It is thoroughly modern and the trading center of a rich livestock, agricultural and mining region. Each summer it is host to thousands of tourists en route to the Yellowstone Park. Wilsall and Clyde Park are the principal towns in the Shields River valley.

Tourist Attractions

There are a number of health resorts in the county, among them being Hunter's Hot Springs, Chico Hot Springs and Corwin Hot Springs. Among the dude ranches and hunting lodges in the county are Montanapolis, in the Absarokee Mountains, Randall's O-T-O ranch, and the Smith ranches. Fine fishing, big game hunting, rugged scenery and natural caves and wells, many of them as yet unexplored, are among the other attractions. Many sight-seers insist that the Gardiner entrance is the only proper way to tour the Yellowstone, and that to appreciate the park, it must be seen as one would witness a play, from a logical beginning to an impressive climax, which the northern entrance provides.

PARK COUNTY—Ranks thirteenth in population (11,330); twenty-third in area (1,703,040 acres); fourteenth in combined 1922 crop and livestock value; fourteenth in 1920 mineral production; seventh in bank deposits, 1922; twelfth in assessed valuation, 1922. Acres public land, 15,146; acres state land, 35,635; acres national forests, 766,656; national parks, 79,104.

WEALTH PRODUCTION—Estimated 1922 crop value, $1,589,100; estimated livestock value, January, 1923, $2,349,000; metal production, 1920, $89,360; coal production, 1920, $1,000; 1921 lumber cut, 386 M. feet; total bank deposits, September 15, 1922, $4,643,658.

TAXATION 1922—Total assessed valuation, $31,790,209; total taxable value, $9,999,056. Total outstanding county bond indebtedness, $501,000; total outstanding county warrant indebtedness, $2,308; total outstanding school bond indebtedness, $142,178; other school debts, $2.004. Total general and special county taxes, $185,709; total general and district school taxes, $206,198; total municipal taxes, $171,960; total state taxes, $47,522; total tax (inclusive municipal), per capita, $53.96.

EDUCATIONAL—Number graded schools, 71; enrollment, 1,828. Number high schools, 3; enrollment, 393.

BUSINESS STATISTICS—Number of railroads, 1; railway mileage, exclusive of spurs and sidetracks, 108.99. Number of manufactures, 46; average number wage earners, 741; value of products, $1,856,050. Number of banks, 10. Number general stores, 17; confectionery, etc., 31; groceries and meats, 30; lumber yards, 10; total number merchants, 281. Total assessed valuation 1922 merchandise, $890,662. Number grain elevators, 11; total capacity, 405,000 bushels. Number creameries, 2. Number flour mills, 1. Number saw mills, 15. Number of lawyers, 10. Number of physicians, 13. Developed hydro-electric plant capacity, 3,100 horse power.

AGRICULTURE (1920 census)—Number farms, 756; farm acreage, 613,597; improved farm acreage, 168,679; irrigated acreage, 52,854; average value all property, per farm, $28,561. Livestock assessed 1922—number cattle, 24,142; number sheep, 46,577; number horses, 7,249; number swine (census), 6,402.

CLIMATOLOGICAL DATA—At Livingston. Elevation, 4,491 feet. Average date last killing frost in spring, May 18; average date first killing frost in fall, September 19.

	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Aver. Prec.	.60	.55	.87	1.20	3.19	1.77	1.16	.88	1.60	1.03	.89	.49	14.23
Aver. Temp.	25.1	27.3	33.8	43.1	51.2	60.2	68.0	66.6	57.2	48.1	36.2	29.3	45.5

County Seat, Livingston. Population County Seat, 6,311.
County Agricultural Agent—No.

GALLATIN COUNTY

IN EARLY territorial days when gold was the only inducement for people to come to Montana, a few far-seeing immigrants appreciated the value of the fertile soil of the Gallatin valley and established farms there instead of going on to the gold camps. It quickly became the banner crop producing region of Montana. Though several other counties that by reason of large wheat producing areas surpassed it in 1922 in total crop production, it ranks third in combined crop and livestock value. In diversified farming and a stabilized system of agriculture it is one of the foremost. In scenic and tourist attractions, it is surpassed by no district. It has many mineral resources of considerable industrial value which have not received the attention they deserve.

Situated in south central Montana, Gallatin county is 115 miles long north and south, and 20 to 40 miles wide. Over 100,000 acres along the eastern boundary are included within the Yellowstone National Park. The continental divide of the Rocky Mountains marks the southern boundary where Montana adjoins Idaho. More than a third of the county's area is included within national forests. Most of the farming areas are in the north half of the county, the largest and best known of which is Gallatin valley. Mountain streams furnish abundant water for irrigation purposes. A deep black loam soil predominates in the Gallatin valley. On the extensive encircling bench lands the soil is a rich clay loam with some gravelly loam.

Farm Areas in North End

Considering the prevailing type of farming and the large irrigated acreage, the average Gallatin farm is large, containing about 200 acres. Non-irrigated farming is followed on the benches. The valleys and some of the uplands are under irrigation. Wheat, oats, peas, barley and hay crops are grown. Wheat is the chief crop, that raised on the benches usually bringing a premium. Oats yield well and weigh heavy. Peas are an important crop, both for seed and canning. Alfalfa, timothy and clover are the chief forage crops. The livestock industry, both range and pure-bred herds, is well developed. Summer grazing is found in the national forests. There are probably more pure-bred livestock—cattle, sheep and swine—in Gallatin than in any other county. Conditions in the Gallatin valley are ideal for dairying, and the industry is growing. The opportunity for experienced dairymen is exceptionally good.

Copper, gold and silver have been commercially produced. The county also has coal, oil shale, manganese, asbestos, corundum, brick clay, pottery clay, large deposits of onyx, cement materials, limestone and several kinds of building stone.

Variety of Minerals

A number of manufacturing establishments using the products and resources of the region have been established. These include flour and cereal mills, a cement plant at Trident, creameries and cheese factories, saw mills, a planing mill and a brick and clay plant. There is a cannery at Bozeman with a capacity of 150,000 cases of peas.

Transportation facilities are unusually good. The main line of the Northern Pacific crosses the county east to west, a branch runs south out of Manhattan to Anceney. The main line of the Chicago, Milwaukee & St. Paul follows the western boundary line, and it has a long branch line out of Three Forks that loops through the heart of the Gallatin valley, and two branches running north and south out of Bozeman. The Oregon Short Line branch to Yellowstone, the western entrance of the Yellowstone Park, has its terminus in the southern end of the county. The main east and west highways cross the county, and a new 90-mile highway from Bozeman up the Gallatin River to Yellowstone has just been completed.

Bozeman is the largest city in the county and thoroughly modern. The State College of Agriculture and Mechanic Arts is situated here. Many families are drawn to it by the educational facilities offered. Three Forks, with two railroads, has a population of 2,000, and is a modern little city, with its own water plant and well lighted by electricity. Manhattan is a milling and shipping point. Belgrade has flouring mills and elevators and is a grain buying and shipping point. Willow Creek is located in the heart of a prosperous agricultural district. At Trident there is a large cement factory employing a large number of men. Logan is a junction point on the Northern Pacific railroad. Salesville, in the southern part, and Maudlow, in the northern part, are shipping points.

GALLATIN COUNTY—Ranks eighth in population (15,864); twenty-sixth in area (1,604,480 acres); third in combined 1922 crop and livestock value; eighth in bank deposits, 1922; seventh in assessed valuation, 1922. Acres public land, 13,347; acres state land, 51,190; acres national forests, 578,590; acres national parks, 129,792.

WEALTH PRODUCTION—Estimated 1922 crop value, $3,640,000; estimated livestock value, January, 1923, $2,099,500; 1921 lumber cut, 1,207 M feet; total bank deposits, September 15, 1922, $4,563,734.

TAXATION 1922—Total assessed valuation, $47,332,213; total taxable value, $15,401,690. Total outstanding county bond indebtedness, $695,000; total outstanding county warrant indebtedness, $5,401; total outstanding school bond indebtedness, $441,385. Total general and special county taxes, $335,096; total general and district school taxes, $350,748; total municipal taxes, $150,331; total state taxes, $72,065; total tax (inclusive municipal), per capita, $57.25.

EDUCATIONAL—Number graded schools, 78; enrollment, 2,841. Number high schools, 8; enrollment, 821. Other institutions, State College of Agriculture and Mechanic Arts, Bozeman—1,062 students, 98 instructors.

BUSINESS STATISTICS—Number of railroads, 3; railway mileage, exclusive spurs and sidetracks, 249.35. Number of manufactures, 55; average number wage earners, 336; value of products, $4,368,359. Number of banks, 12. Number general stores, 20; confectionery, etc., 23; groceries and meats, 44; lumber yards, 14; total number merchants, 376. Total assessed valuation 1922 merchandise, $1,631,540. Number grain elevators, 21; total capacity, 1,382,000 bushels. Number creameries, 3. Number flour mills, 4. Number saw mills, 11. Number of lawyers, 26. Number of physicians, 17.

AGRICULTURE (1920 census)—Number farms, 1,349; farm acreage, 783,189; improved farm acreage, 350,776; irrigated acreage, 103,975; average value all property, per farm, $31,769. Livestock assessed 1922—number cattle, 22,636; number sheep, 18,028; number horses, 11,194; number swine (census), 11,504.

CLIMATOLOGICAL DATA.—At Bozeman. Elevation, 4,771 feet. Average date last killing frost in spring, May 22; average date first killing frost in fall, September 12.

	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Ave. Prec.	.85	.81	1.26	1.72	3.49	3.00	1.27	1.02	1.72	1.35	.94	1.02	18.45
Ave. Temp.	21.2	22.4	30.2	40.4	48.8	57.0	63.6	62.5	52.6	43.4	31.4	23.3	41.4

County Seat, Bozeman. Population County Seat, 6,183.

County Agricultural Agent—Yes.

SOUTH WESTERN MONTANA

Holds Front Rank in Mining, Stockraising and Irrigated Acreage—Butte the Largest City in Montana and Most Important Distributing Point—Ranches Above the Average in Size.

Through Beaverhead and Madison counties, South Western Montana takes first place in stockraising, irrigated acreage and wild hay production, and through Silver Bow county it also leads in mining, and has the largest city and the most important distributing point in the state. Largely, perhaps, because of inadequate rail facilities, agricultural possibilities of Madison county have not received the recognition to which they seem to be entitled. Except for a part of Silver Bow county, the district lies in the slope region east of the main range of the Rocky Mountains.

While Silver Bow is the leading producer in the state, as well as one of the most important in the country, of copper, zinc, silver and arsenic, an unusually wide variety of minerals are found in Beaverhead and Madison counties, many of which are undeveloped. Considerable developed and undeveloped waterpower is in the district.

Madison county is reputed to be one of the finest fishing regions in the United States. In the district are many tourist attractions. The western entrance to the Yellowstone National Park is here.

The agricultural areas range in elevation from 4,000 to 5,000 feet. The upper mountain valleys are devoted to hay for winter livestock forage. The growing season averages from 90 to 110 days.

SILVER BOW COUNTY

BUTTE, the world's largest mining camp, is to all intents and purposes Silver Bow county. While it was founded and grew to fame upon its mineral resources, it has developed into the largest distributing point in the state and is an important industrial center. In production of butter and packing-house products, it leads the state. The largest city between the Twin Cities on the east and Spokane on the west, Butte is an odd and interesting combination of mining camp, modern metropolis, manufacturing point and well-kept residential center.

Silver Bow, the third smallest county, lies in southwestern Montana. The summit of the main range of the Rocky Mountains forms most of its eastern boundary, the Highland Mountains, Camp Creek and the Big Hole River its southern boundary, while its irregular western and northern boundaries are formed by hills and mountains.

The elevation of the county ranges from a minimum of approximately 5,000 feet above sea level to a maximum of 10,000 feet. The growing season is short and the tillable areas small, factors which limit the crop production range. What agriculture there be is influenced by the Butte market. Truck gardening and dairying are its most important phases.

Butte takes its name from the huge isolated butte that stands sentinel-like on the western end of town. Founded in 1864 as a placer camp, it was nearly deserted

Vast Underground Workings

January 1, 1875, when William L. Farlin re-located the Travona quartz lode, and, with nearly every blow of the pick uncovered ore so rich that it led to the development of the entire district and the building of the greatest mining camp in the world. More than 90 per cent of the total Montana mineral production normally comes from the Butte district, which contains 150 mines with underground workings totaling 2,700 miles. When working to capacity the 16 larger companies, operating 40 mines, employ 22,000 miners who hoist 20,000 tons of ore every 24 hours. One mining company alone employs in normal times as many metal miners as the states of Colorado, Utah and New Mexico combined. The Steward is said to be the deepest mine in Butte, measuring 3,653 feet from the collar to the sump. Most of the ore now comes from between the 2,000 and 3,000 foot levels. Through scientific ventilation methods, excessive underground temperatures at the lower levels have been reduced as much as 10 to 15 degrees, and it is believed that in case the ore bodies reach to a depth of 5,000 feet, atmospheres that allow of safe and efficient work can be attained. In some parts of the district underground fires have been burning for many years. The most widely known and extensive fire has burned continuously since 1889.

The total value of the mineral output of Butte since its discovery is variously estimated from a billion to a billion and a half dollars. Copper, zinc and silver are the chief metals, although gold, lead, arsenic and a score of other minerals are obtained as by-products. The normal production of copper ranges from 260,000,000 to more than 300,000,000 pounds a year; of silver, approximately 12,000,000 ounces, and of zinc from 30,000 to 100,000 tons annually. While the large manganese deposits are not being worked at present, they are pronounced by the U. S. Geological Survey as among the most valuable reserves of this metal in the country. Gems, bismuth, antimony, cadium, brick clay and clay assay goods are all produced commercially.

Besides being a distributing point for a wide variety of farm and manufactured products, Butte is an important manufacturing center, and the largest consuming market in Montana. Industries include smelters, concentrators, foundries and machine shops, monumental works, bakeries, creameries, brick, clay and assay goods, planing and saw mills, meat packing, bottling works, sporting goods and plants making macaroni, mattresses, overalls, saddles and harness, tents and awnings, metallic packing and other products.

Butte enjoys the best rail facilities of any city in the state and is strategetically located to command the trade of an interstate region. The main lines of the

Its Rail Facilities

Northern Pacific and of the Chicago, Milwaukee & St. Paul bring it trade from east and west; the Butte-Great Falls branch of the Great Northern brings it trade from the north, and it is the northern terminus of the Pocatello branch of the Oregon Short Line that brings trade from the south. An electrified rail system connects it with Anaconda. The trade from many branch lines in the district naturally gravitates to Butte. The city is also on the principal east and west highways, and on two Park-to-Park highways.

The State School of Mines is located at Butte. Thoroughly equipped, and with a large faculty, the school draws students from all parts of this as well as

from foreign countries because of its proximity to the world's largest mines and mills. Besides the system of public graded and high schools, there is a parochial system of graded and high schools.

A contribution to the cause of good government was made by Butte, when, through the efforts of some of its citizens, an amendment to the state constitution and supplementary legislation was enacted, permitting the consolidation of city and county governments. "A far-reaching piece of legislation which will enable Montana to blaze the trail for the nation in county government," was the opinion expressed by Dr. A. R. Hatton of Cleveland, consultant of the National Municipal League.

For many years Butte has been one of the unique cities of the country from the sightseer's point of view. Leading the nation in electrically operated mining, milling, smelting and refining enterprises, Butte draws mining and scientific men from all over the world to study the methods used in its mines. Columbia Gardens, Butte's most popular playgrounds, are noted for varieties of flowers which require long sunny days and relatively mild sun-heat during the growing season. Pansies and begonias do especially well.

SILVER BOW COUNTY—Ranks first in population (60,313); fifty-third in area (464,640 acres); fifty-second in combined 1922 crop and livestock value; first in 1920 mineral production; first in bank deposits, 1922; first in assessed valuation, 1922. Acres public land, 20,288; acres state land, 15,871; acres national forests, 185,470.

WEALTH PRODUCTION—Estimated 1922 crop value, $156,300; estimated livestock value, January, 1923, $524,000; metal production, 1920, $60,929,101; total bank deposits, September 15, 1922, $25,363,908.

TAXATION 1922—Total assessed valuation, $116,920,290; total taxable value, $30,861,635. Total outstanding county bond indebtedness, $1,138,000; total outstanding county warrant indebtedness, $187,298; total outstanding school bond indebtedness, $431,683; other school debts, $69,779. Total general and special county taxes, $683,622; total general and district school taxes, $635,039; total municipal taxes, $458,626; total state taxes, $141,838; total tax (inclusive municipal), per capita, $31.82.

EDUCATIONAL—Number graded schools, 35; enrollment, 6,689. Number high schools, 2; enrollment, 1,706. Other institutions, State School of Mines, Butte, 138 students, 16 instructors.

BUSINESS STATISTICS—Number of railroads, 6; railway mileage, exclusive spurs and sidetracks, 155.99. Number of manufactures, 125; average number wage earners, 1,238; value of products, $13,979,782. Number of banks, 6. Number general stores, 15; confectionery, etc., 116; groceries and meats, 257; lumber yards, 7; total number merchants, 1,045. Total assessed valuation 1922 merchandise, $6,691,630. Number creameries, 4. Number saw mills, 2. Number lawyers, 128. Number of physicians, 60.

AGRICULTURE (1920 census)—Number farms, 331; farm acreage, 100,170; improved farm acreage, 28,238; irrigated acreage, 11,519; average value of all property, per farm, $8,799. Livestock assessed 1922—number cattle, 5,136; number sheep, 9,002; number horses, 2,003; number swine (census), 1,375.

CLIMATOLOGICAL DATA—At Butte. Elevation, 5,716 feet. Average date last killing frost in spring, May 29; average date first killing frost in fall, September 18.

	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Ave. Prec.	.84	.78	1.09	1.13	2.09	2.23	1.26	.85	1.18	.97	.81	.82	14.05
Ave. Temp.	23.6	25.0	31.2	40.7	48.3	56.4	64.1	63.0	53.1	43.7	32.9	25.1	42.3

County Seat, Butte. Population County Seat, 41,611.
County Agricultural Agent—No.

MADISON COUNTY

MADISON might well be called the parent county of Montana. While the original gold discovery in the state was made elsewhere, it was the finding of the rich diggings on Alder Gulch by the William Fairweather party in the summer of 1863 that brought the first rush of people to the territory and led to the development of the entire region. It is estimated this one gulch produced $150,000,000 in placer gold, most of it taken from the sluice boxes of the early-day miners. The balance was recovered by giant dredges during the past fifteen years. From a mining county of 50 years ago, Madison developed into an important stock-raising and agricultural region. It ranks among the leaders in stock-raising, crop production and also mining. The latter industry has declined, not because the mineral resources were exhausted, but because development was turned into other lines. It is one of the most highly mineralized districts in the state and possesses many minerals that are principally used as process materials and alloys.

Mountains and Valleys

Madison county is situated in southwestern Montana on the eastern side of the Rocky Mountains, the crest of which forms part of its border in the southern corner on the Montana-Idaho boundary. It extends north to the Jefferson river, touches the Big Hole river on the west and on the east, and takes in most of the Madison range of mountains. It is a region of mountains and long, well-watered valleys whose general course is north and south. The valleys range in elevation from 4,200 to 5,000 feet. The principal ones are the Madison, Jefferson, Ruby, Beaverhead, Big Hole and the South Boulder. There are more than 115,000 acres of irrigated land in the county and it is estimated an additional 60,000 acres can be irrigated at reasonable cost.

Stock raising is the leading industry, with large ranches and large scale production as a rule. More than a fourth of the county is included within the national forests, which, with an additional 180,000 acres of unreserved public domain, and an abundance of springs and streams, provide ideal summer grazing. In the higher valleys, better adapted to alfalfa and wild hay than to other crops, the home ranches of most of the stock outfits are found. Madison has never received the recognition in an agricultural way to which its yields per acre entitle it. This is due, perhaps, to the fact that only along its northern border is there a main line of travel. The lower valleys and benches are devoted mostly to general farming. Wheat, oats, barley and rye all produce good yields. Madison county oats are in demand for cereal purposes. Hardy varieties of corn are grown in a number of districts. For many years seed peas have been grown. (1700 acres were under contract in 1923.) Soil and climate are favorable for potato growing, about 1,000 acres being grown annually for commercial purposes. There is a trend toward diversified farming that includes milk cows, hogs and poultry. While soil types vary, a deep alluvial soil predominates, with some heavy clays and gravel in places. In the northern part of the county, near Harrison, there is some non-irrigated farming, but irrigated farming is the rule.

The Tobacco Root Mountains, running north and south through the middle of the county, between the Ruby and Madison Rivers, is one of the most highly mineralized regions in the west, but no deep development has been done. There is scarcely a district in the county but has produced some sort of mineral wealth. Gold, silver, copper, lead and zinc have been produced commercially. Coal, gypsum, gems, manganese, molybdenum, nitrate, asbestos, barite, mica, tungsten and fluorite are among the other minerals whose existence is reported.

Rich in Minerals

Their presence, considered in connection with 16,700 developed hydro-electric horse power and 70,000 undeveloped horse power on the Madison river, may lead some day to the establishment of industries. Near the headwaters of the Madison is the Hebgen reservoir of the Montana Power Company with a storage capacity of 325,000 acre feet, the seventh largest storage reservoir in the world, which furnishes, with the aid of the smaller storages available at the plants of the company, "a regulation of the flow of the Madison and Missouri Rivers probably unequaled by any power system in the world".*

The northern part of the county is served by the main lines of the Northern Pacific and the Chicago, Milwaukee & St. Paul. The western part of the county is served by a branch line of the Northern Pacific from Whitehall, south through the Jefferson and Ruby valleys to Alder, which is near the geographical center of the county. The eastern district, through the Madison valley, is tapped by another Northern Pacific branch out of Sappington, which forks at Harrison, one fork going to Pony and the other to Norris. There is a big and promising district in the south end of the county whose development is retarded by lack of transportation. A highway connecting with the West Yellowstone entrance to the Yellowstone Park runs north up the Madison to a junction with a main east and west highway via Butte. At Ennis this road connects with another highway that swings west through Virginia City and thence north through Sheridan and Twin Bridges to Whitehall.

Twin Bridges, on the western side of the county, where the Ruby, Beaverhead and Big Hole Rivers unite to form the Jefferson, is the largest town, according to the 1920 census, and a few miles south of it lies Sheridan, the second largest. Ennis, in a stock-growing region, is the largest town on the eastern, or Madison River side. On the lower Madison are Pony, Harrison and Norris. The latter is the terminus of the branch line railroad up the Madison and a distributing and shipping point for a large territory. Virginia City, situated in almost the exact geographical center of the county, was the first incorporated city in the territory and for a number of years the territorial capital. Waterloo, in the northwestern part, is a shipping point for a good agricultural district. Adjacent to most of these towns are mining districts.

Noted Fishing District

Many sportsmen consider the finest trout fishing in the United States is to be had in Madison county. There is also good big game hunting. There are four hot springs resorts in the county, the Norris at Norris, the Potosi near Pony, the Barkell at Silver Star, near Twin Bridges, and Pullers Hot Springs near Alder. The territorial history of Montana was largely made in Madison county and there are many points of interest to historians as well as tourists, such as the Road Agents' cemetery at Virginia City, the Robbers' Roost on Ramshorn Creek, and the collection of relics and curios in the Thompson Memorial Library at Virginia City.

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*Brochure of Montana Power Company.

MADISON COUNTY—Ranks twenty-eighth in population (7,495); thirteenth in area (2,318,080 acres); seventh in combined 1922 crop and livestock value; eleventh in 1920 mineral production; thirtieth in bank deposits, 1922; twenty-ninth in assessed valuation, 1922. Acres public land, 181,140; acres state land, 125,071; acres national forests, 759,349.

WEALTH PRODUCTION—Estimated 1922 crop value, $2,077,900; estimated livestock value, January, 1923, $3,129,000; metal production, 1920, $393,140; 1921 lumber cut, 586 M feet; total bank deposits, September 15, 1922, $1,124,078.

TAXATION 1922—Total assessed valuation, $20,017,662; total taxable value, $6,561,594. Total outstanding county bond indebtedness, $150,000; total outstanding county warrant indebtedness, $6,418; total outstanding school bond indebtedness, $147,662; other school debts, $10,436. Total general and special county taxes, $139,781; total general and district school taxes, $137,107; total municipal taxes, $9,690; total state taxes, $32,342; total tax (inclusive municipal), per capita, $42.55.

EDUCATIONAL—Number graded schools, 57; enrollment, 1,365. Number high schools, 10; enrollment, 259. Other institutions, State Orphans' Home, Twin Bridges.

BUSINESS STATISTICS—Number of rialroads, 2; railway mileage, exclusive spurs and sidetracks, 79.39. Number of manufactures, 19; average number wage earners, 17; value of products, $89,244. Number of banks, 6. Number general stores, 18; confectionery, etc., 11; groceries and meats, 10; lumber yards, 8; total number merchants, 127. Total assessed valuation 1922 merchandise, $307,289. Number grain elevators, 4; total capacity, 91,000 bushels. Number flour mills, 1. Number saw mills, 17. Number of lawyers, 7. Number of physicians, 7. Developed hydro-electric plant capacity, 16,700 horsepower.

AGRICULTURE (1920 census)—Number farms, 901; farm acreage, 564,516; improved farm careage, 168,635; irrigated acreage, 115,598; average value all property, per farm, $24,613. Livestock assessed 1922—number cattle, 36,992; number sheep, 127,717; number horses, 9,392; number swine (census), 7,111.

CLIMATOLOGICAL DATA—At Norris. Elevation, 4,846 feet. Average date last killing frost in spring, May 16; average date first killing frost in fall, September 28.

	No. Yrs. Record	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Ave. Prec.		.14	.56	59	.97	1.41	3.73	2.69	1.25	1.09	1 92	1.71	.68	.47	17.07
Mean Temp.		.15	25.1	28.1	35.3	43.6	50.2	59.5	67.6	66 5	52.6	46.6	36.5	26.6	44.8

County Seat, Virgingia City. Population County Seat, 342.
County Agricultural Agent—Yes.

BEAVERHEAD COUNTY

IN 1862 the scene of the gold discovery that first put Montana on the map, Beaverhead county has kept pace with progress in the years since then, a fact better appreciated when it is known it is the banner county of the state in livestock value and in irrigated acreage. In combined crop and livestock value it stands second and in mineral production eleventh. Stock raising, farming and mining are the leading industries and they continue steadily to expand. More than a third of the county's area is within national forests.

It is a region of mountains and well-watered valleys, flanked on the northwest, the southwest and the south by encircling folds of the continental divide. Smaller ranges are found in the interior of the county. Clay loam is the principal type of soil in the cultivated areas.

Topography and elevation make Beaverhead county peculiarly well adapted to livestock raising. The ranches are considerably above the state average in size and for the past few years the tendency here in the livestock business has been toward a consolidation of individual holdings under one individual or corporate ownership. The higher valleys, the Big Hole, Horse Prairie, Grasshopper, Centennial, Blacktail, Sage Creek, Sheep Creek and Medicine Lodge are the winter feeding grounds for beef steers and large bands of sheep. The steers, raised on grass and hay without a pound of grain, are turned off fat for the spring

market, coast and middle western buyers usually contracting them in the pastures for delivery at the loading stations. The unusually nutritious grasses permit the handling of cattle in this way, a method followed in no other northwestern districts. The lower valleys, like the Beaverhead, run more to mixed farming and smaller holdings. Small grains, potatoes, seed peas and alfalfa are the principal crops. Much of the farm truck finds a ready market in the adjoining mining county of Silver Bow. Considerable grain is raised on the non-irrigated bench lands, but irrigated farming is the dominant type.

Enlarge Irrigated Acreage

The irrigated acreage is being enlarged. Near Dillon all the preliminary field work has been completed on the East Bench project for the reclamation of 23,000 acres of land and near Lima in the south end of the county a project is nearing completion that will reclaim from 8,000 to 10,000 acres. The lands to be irrigated near Lima are partly settled but the project was put in so that additional settlers can be taken care of on land heretofore used for grazing.

Beaverhead county has abundant mineral resources, many of which have not been developed. It has commercially produced gold, silver, copper, lead and graphite. The graphite is said to be the best in quality in the United States. It also has coal, oil shale, phosphate, manganese, iron, mica, brick clay and limestone, sandstone and quartzite. A plant for the treatment of oil shale has been built. The principal mining districts are in the Elkhorn Mountains in the northern part of the county. Industries include flour milling, lumbering and dairy products. There is a primary horse market at Dillon.

The Oregon Short Line railroad from Salt Lake to Butte runs through the center of the south half of the county and then continues north near the eastern boundary. A subsidiary of the Northern Pacific runs west and south through the south end, and a narrow gauge railroad penetrates the Elkhorn Mountains.

Old West Lingers

Dillon, the county seat, is the largest town in southwestern Montana. It is modern in all respects and one of the most important livestock shipping points in the state. Armstead is a trading center for the south end of the county and a district in Idaho. Lima, in the southern end, is a thriving little town of 500 persons, a division point between Idaho Falls and Butte with railway shops.

The county is rich in historic lore of the early days and holds many other attractions for tourists; excellent hunting and fishing, large cattle ranches in the Big Hole basin where the flair of the old west still lingers, and three hot springs, the Zeigler, near Apex, Elkhorn, near Dillon, and the Hotel Hot Springs, at Jackson. The main trunk line highway between Montana and Utah and California traverses the county, and also the western scenic route between the Yellowstone and Glacier National Parks.

BEAVERHEAD COUNTY—Ranks twenty-ninth in population (7,369); second in area (3,620,480 acres); second in combined 1922 crop and livestock value; twelfth in 1920 mineral production; eleventh in bank deposits, 1922; seventeenth in assessed valuation, 1922. Acres public land, 625,212; acres state land, 205,299; acres national forests, 1,399,676; acres Indian military reservations, five.

WEALTH PRODUCTION—Estimated 1922 crop value, $2,405,300; estimated livestock value, January, 1923, $4,960,000; metal production, 1920, $287,064; 1921 lumber cut, 213 M feet; total bank deposits September 15, 1922, $3,823,676.

TAXATION 1922—Total assessed valuation, $24,776,027; total taxable value, $7,930,826. Total outstanding county bond indebtedness, $30,000; total outstanding county warrant indebtedness, $18,909; total outstanding school bond indebtedness, $275,955; other school debts, $7,315. Total general and special county taxes, $154,580; total general and district school taxes, $154,030; total municiptal taxes, $39,657; total state taxes, $40,015; total tax (inclusive municipal), per capita, $52.69.

EDUCATIONAL—Number graded schools, 41; enrollment, 1,235. Number high schools, 3; enrollment, 272. Other institutions, State Normal School, Dillon—1654 students and 82 instructors.

BUSINESS STATISTICS—Number of railroads, 3; railway mileage, exclusive spurs and sidetracks, 152.06. Number of manufactures, 23; average number wage earners, 61; value of products, $343,181. Number of banks, 6. Number general stores, 14; confectionery, etc., 11; groceries and meats, 16; lumber yards, 4; total number merchants, 165. Total assessed valuation 1922 merchandise, $601,544. Number grain elevators, 3; total capacity, 85,000 bushels. Number creameries, 1. Number flour mills, 1. Number saw mills, 9. Number of lawyers, 11. Number of physicians, 6. Developed hydro-electric plant capacity, 4,770 horse power.

AGRICULTURE (1920 census)—Number farms, 642; farm acreage, 637,009; improved farm acreage, 270,603; irrigated acreage, 302,375; average value all property, per farm, $41,163 Livestock assessed 1922—number cattle, 65,219; number sheep, 158,724; number horses, 12,208; number swine (census), 2,558.

CLIMATOLOGICAL DATA—At Dillon. Elevation, 5,143 feet. Average date last killing frost in spring, June 1; average date first killing frost in fall, September 5.

	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Ave. Prec.	.92	.74	1.31	1.89	3.25	2.66	1.44	1.17	1.61	1.00	.95	.78	17.72
Ave. Temp.	24.2	27.6	33.5	42.3	50.6	58.3	63.7	61.8	53.1	46.1	35 1	26.3	43.6

County Seat, Dillon. Population County Seat, 2,701.

County Agricultural Agent—No.

In a Montana Oil Field

EAST CENTRAL MONTANA

Growing Season Long and Hot—In Acreage Devoted to Corn Leads State—Large Areas in the Western Part Are Awaiting the Coming of a Railroad—Irrigation in Yellowstone Valley.

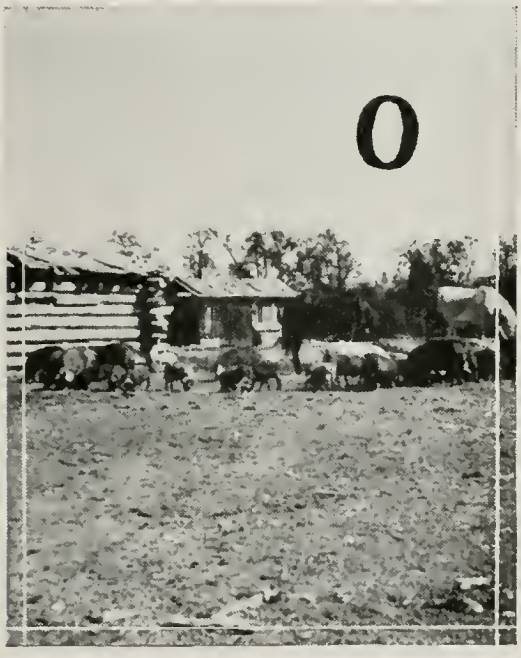
Three decades ago devoted exclusively to stockraising, crop production has taken the lead in the eastern tier of counties—Richland, Wibaux and Dawson—in East Central Montana, but stockgrowing is the chief wealth producer in Prairie, McCone and Garfield in the western tier. While non-irrigated farming is the dominent method, there being little irrigated land outside of the Yellowstone valley in the southeastern quarter, the irrigated district of Richland county has made good progress toward the establishment of a diversified system of agriculture that includes a generous amount of livestock. Seed production here is important.

The western half is handicapped by inadequate transportation facilities, and development of its resources has been retarded. Spring wheat is the principal crop within hauling distance of the railroad. More remote districts are turning to flax, alfalfa seed and less bulky crops. The district leads all others in corn, which gives good yields of both grain and forage. Swine production is increasing.

Lignite coal abounds. Natural gas has been discovered, and is used in Glendive. Barite, iron, potash and clay deposits are reported to exist.

The growing season ranges from 105 to 125 days and the elevation from 1,978 feet in the eastern district to 2,800 in the western.

WIBAUX COUNTY



One of the noted stock districts of the northwest in the old range days, agriculture has forged ahead until it is now the dominant industry of Wibaux county. The one-crop system has prevailed, but an expanding acreage in corn and a broader interest in swine, foreshadow the advent of diversified farming.

Wibaux lies in east central Montana. The Dakota-Montana boundary marks its eastern border. It is about 50 miles long, north and south and 25 miles wide. The western and southwestern portions of the county are devoted almost exclusively to grazing, because of their rough, broken nature. The principal agricultural areas are the Beaver Creek valley, running north and south through the middle of the county, and the Golden Valley, in the southeastern part. The Golden Valley soils are very fertile. Corn is generally grown for feed and grain. Along the bottom lands of Beaver Creek alfalfa does well.

Spring wheat is the chief crop, its acreage being larger than that of all other crops combined. Oats, hay, corn, flax and rye follow in order.

Coal is produced in commercial quantities and large deposits of barite are reported to exist.

The main line of the Northern Pacific crosses the county. The northern district, whose drainage is into the Yellowstone, finds its nearest rail haul ferrying across the Yellowstone to the Glendive-Sidney branch of the Northern Pacific. The Golden Valley district is served by a branch line of the Northern Pacific running southeasterly from Beach, North Dakota. A main east and west highway parallels the main line of the Northern Pacific.

Wibaux, the county seat, is the principal town. It has all modern municipal improvements and commands the trade of the Beaver Creek farming district. Carlyle is the principal trading point in the county of the Golden Valley district.

WIBAUX COUNTY—Ranks fifty-first in population (3,113); fifty-first in area (565,120 acres); fortieth in combined 1922 crop and livestock value; twenty-fifth in 1920 mineral production; forty-third in bank deposits, 1922; fifty-third in assessed valuation, 1922. Acres public land, 17,555; acres state land, 31,757.

WEALTH PRODUCTION—Estimated 1922 crop value, $1,398,900; estimated livestock value, January, 1923, $754,000; coal production, 1920, $10,734; total bank deposits, September 15, 1922, $643,246.

TAXATION 1922—Total assessed valuation, $9,381,451; total taxable value, $3,034,783. Total outstanding county bond indebtedness, $153,000; total outstanding county warrant indebtedness, $7,588; total outstanding school bond indebtedness, $51,232; total general and special county taxes, $69,005; total general and district school taxes, $69,701; total municipal taxes, $10,434; total state taxes, $14,527; total tax (inclusive municipal), per capita, $52.57.

EDUCATIONAL—Number graded schools, 41; enrollment, 815. Number high schools, 2; enrollment, 131.

BUSINESS STATISTICS—Number of railroads, 1; railway mileage, exclusive spurs and sidetracks, 21.06. Number of manufactures, 3; average number wage earners, 4; value of products, $21,294. Number of banks, 3. Number general stores, 3; groceries and meats, 3; lumber yards, 4; total number merchants, 48. Total assessed valuation 1922 merchandise, $157,080. Number grain elevators, 9; total capacity, 320,000 bushels. Number of lawyers, 5. Number of physicians, 2.

AGRICULTURE (1920 census)—Number farms, 532; farm acreage, 336,167; improved farm acreage, 140,299; irrigated acreage, 200 (estimated); average value all property, per farm, $17,653. Livestock assessed 1922—number cattle, 9,116; number sheep, 2,713; number horses, 6,575; number swine (census), 1,899.

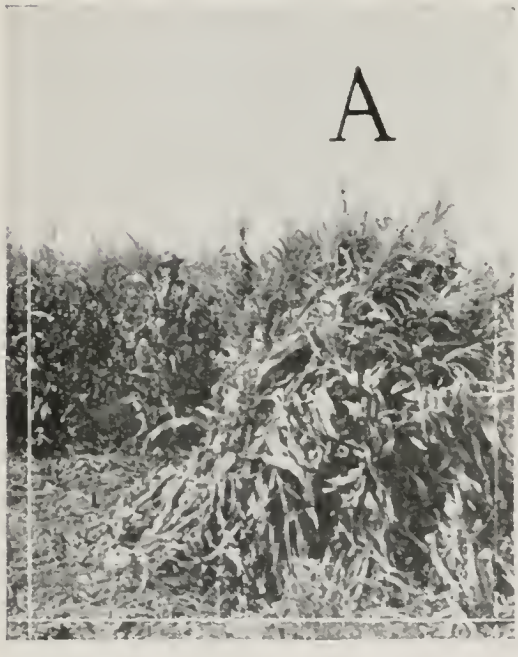
CLIMATOLOGICAL DATA—At Wibaux. Elevation, 2,674 feet. Average date last killing frost in spring, May 28; average date first killing frost in fall, September 10.

	No. Yrs. Record	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Normal Prec.		.54	.25	.68	.88	2.28	4.27	1.54	1.38	1.10	.80	.59	.42	14.73
Mean Temp.		14	14.4	16.5	26.6	44.2	54.7	61.0	69.2	66.2	55.7	44.1	29.0	18.0	41.8

County Seat, Wibaux. Population County Seat, 611.

County Agricultural Agent—No.

RICHLAND COUNTY



AGRICULTURAL in character, Richland county offers possibilities in both irrigated and non-irrigated farming. In the development of a diversified type of farming that includes a generous amount of livestock, it is one of the leading districts of the state.

Richland lies in east central Montana, the Dakota-Montana boundary marking its eastern and the Missouri River its northern borders. It is approximately 55 miles long east and west and 35 to 45 miles wide north and south. In elevation, it is one of the lowest parts of Montana, ranging from 1,900 to 2,500 feet. The growing season is hot and fairly long. In the Yellowstone valley, which cuts diagonally across the southeastern part, is the only large body of irrigated land in the county. It is included within the Lower Yellowstone project of the United States Reclamation Service. Some smaller tracts are irri-

gated by pumping, and it is estimated about 25,000 acres additional, of which 10,000 acres lie along the Missouri River, are irrigable. A clay loam soil predominates in the Yellowstone valley, while on the uplands devoted to non-irrigated farming soil types range from sandy to clay loam. Lignite coal is found throughout the county. Except for certain areas along the Missouri River, most of the county is tillable.

Features Seed Production

Spring wheat, corn, alfalfa, potatoes, sugar beets, barley, oats and beans are the principal crops in the irrigated district along the Yellowstone. Spring wheat is the principal cash crop in the non-irrigated districts, with oats, corn and barley the leading feed crops. The corn acreage has greatly expanded in recent years and has returned excellent yields of both grain and fodder. Seed production is becoming increasingly important. Alfalfa, corn, oats, sweet clover, beans and Triumph potatoes are the principal seed varieties. Two seed houses have been established at Sidney, primarily to handle the production of the county which is steadily finding a wider market. Investigations have been made looking to the establishment in the county of a factory for canning sweet corn and tomatoes, and of a sugar beet factory.

Since corn became a standard crop in rotation, the swine industry has rapidly developed. Dairying is expanding. Considerable stock is carried in the non-irrigated districts, and in the western end of the county the range stock industry survives, but on a greatly reduced scale from that of earlier years.

The Northern Pacific has a branch line running down the Yellowstone valley from Glendive to Sidney, and the Great Northern has a line that comes up the Yellowstone from Mondak, at East Fairview meeting another line that comes in on the east from Dakota. This line continues up the Yellowstone to Sidney and then swings west. Its present terminus is at Richey, just across the western border of the county, but its extension to Lewistown, forming another main line, is projected.

Sidney, the county seat, is the largest town and chief distributing center. It has all modern municipal improvements. Fairview lies in the heart of the irrigated district.

Richland county is a rich field for the student of early-day western history, much of which in the days of the fur trader was written on the Missouri and Yellowstone Rivers.

RICHLAND COUNTY—Ranks twenty-third in population (8,989); thirty-fifth in area (1,345,920 acres); ninth in combined 1922 crop and livestock value; sixteenth in 1920 mineral production; twentieth in bank deposits, 1922; twenty-seventh in assessed valuation, 1922. Acres public land, 19,399; acres state land, 70,291.

WEALTH PRODUCTION—Estimated 1922 crop value, $2,740,000; estimated livestock value, January, 1923, $1,688,700; coal production, 1920, $70,417; total bank deposits, September 15, 1922, $1,886,976.

TAXATION 1922—Total assessed valuation, $20,790,419; total taxable value, $6,417,429; total outstanding county bond indebtedness, $370,000; total outstanding county warrant indebtedness, $10,409; total outstanding school bond indebtedness, $104,407; other school debts, $88,461. Total general and special county taxes, $203,991; total general and district school taxes, $177,955; total municipal taxes, $19,258; total state taxes, $30,762; total taxes (inclusive municipal), per capita, $48.05.

EDUCATIONAL—Number graded schools, 107; enrollment, 2,010. Number high schools, 4; enrollment, 522.

BUSINESS STATISTICS—Number of railroads, 2; railway mileage, exclusive spurs and sidetracks, 81.76. Number of manufactures, 16; average number wage earners, 41; value of products, $847,965. Number of banks, 10. Number general stores, 22; confectionery, etc., 8; groceries and meats, 11; lumber yards, 11; total number merchants, 161. Total assessed valuation 1922 merchandise, $361,770. Number grain elevators, 16; total capacity, 485,000 bushels. Number creameries, 1. Number flour mills, 3. Number of lawyers, 8. Number of physicians, 6.

AGRICULTURE (1920 census)—Number farms, 1,577; farm acreage, 812,194; improved farm acreage, 311,006; irrigated acreage, 15,450; average value all property, per farm, $13,306. Livestock assessed 1922—number cattle, 20,974; number sheep, 1,607; number horses, 16,779; number swine (census), 3,978.

CLIMATOLOGICAL DATA—At Sidney. Elevation, 1,978 feet. Average date last killing frost in spring, May 20; average date first killing frost in fall, September 22.

	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Aver. Prec.	.51	.42	.58	.91	2.10	3.28	1.97	1.63	1.77	.83	.39	.50	14.89
Aver. Temp.	10.2	12.8	25.4	43.8	55.0	63.2	68.7	67.0	55.9	44.5	28.8	17.6	41.1

County Seat, Sidney. Population County Seat, 1,400.

County Agricultural Agent—Yes.

DAWSON COUNTY

IN EAST Central Montana, one county west of the Dakota boundary, Dawson county two decades ago was noted for its bands of sheep and herds of cattle. Stock-raising still continues but has been supplanted in importance by farming. Glendive, the county seat, is the largest town of the region and a division point on the Northern Pacific which maintains there shops, a hospital, and the only supply station for dining cars between St. Paul and the coast. The Yellowstone river runs in a northeasterly direction through the southeastern part of the county. The land adjacent to many small streams that empty into the Yellowstone is rough and broken, but the uplands between the valleys offer good areas of fertile soils for non-irrigated farming. It is estimated that about 60 per cent of the land of the county is tillable.

Development of the irrigation possibilities along the Yellowstone has been undertaken. In 1923 water was furnished to 1,100 acres under a pumping project with a 40-foot lift, and the reclamation of an additional 2,500 acres under a 75-foot lift is planned. The lands under the 40-foot lift were colonized in 1923 and planted to beans, but the settlers contemplate specializing on sugar beets.

Spring wheat is the chief crop in the county. Winter wheat does not generally survive the winters unless seeded with some kind of stubble to protect it.

Corn an Important Crop

Other small grains are also grown and corn is an important crop, doing well in practically all districts and returning good yields of both fodder and grain. Latterly farmers have been turning more to diversified farming with corn an important feature in the program. The rough and broken lands are good grazing areas. Both cattle and sheep are carried. There is a farmers' shipping association at Glendive.

There are large fields of lignite coal in the county which furnish cheap and abundant fuel for both urban and rural homes and is also utilized as a source of electrical energy. Natural gas is found on the Cedar Creek anti-cline in the southeastern part of the county and is utilized in Glendive for domestic and industrial purposes. Moss agates are found along the Yellowstone river.

Railway shop and repair work at Glendive is the largest and most important industrial activity in the county. Extractive industries at the same point include a creamery and a flour mill.

Transportation facilities are good except in the west central part. The main line of the Northern Pacific traverses the southeastern quarter, and a branch runs northeasterly from Glendive down the Yellowstone River through the irrigated district in Richland county. Richey, near the northern county boundary, is the terminus of a Great Northern branch. Surveys have been completed and much construction done to carry this branch westerly to Lewistown, making an alternate main line. The war interfered with the completion of this railway, but it is thought work may be resumed in 1924. The Yellowstone Trail Highway goes through the county.

Glendive, modern in all respects, is the largest town in the state east of Miles City, and an important trading and distributing point. A dormitory for housing students from the rural districts is operated in connection with the Dawson county high school. A feature of the grade school system is the musical training. Out of an enrollment of about 1,000 pupils, 200 are enrolled in the boys' bands and the school orchestras. Richey is the second largest town. Stipek, Intake, Bloomfield, Union and Lindsay are trading centers.

Some School Features

DAWSON COUNTY—Ranks twentieth in population (9,239); twenty-seventh in area (1,509,760 acres); twenty-first in combined 1922 crop and livestock value; fifteenth in 1920 mineral production; fifteenth in bank deposits, 1922; twentieth in assessed valuation, 1922. Acres public land, 36,628; acres state land, 83,789.

WEALTH PRODUCTION—Estimated 1922 crop value, $1,979,900; estimated livestock value January, 1923, $1,577,400; coal production, 1920, $83,619; total bank deposits, Sept. 15, 1922, $2,262,888.

TAXATION 1922—Total assessed valuation, $22,691,658; total taxable value, $7,421,680. Total outstanding county bond indebtedness, $583,000; total outstanding county warrant indebtedness, $166,385; total outstanding school bond indebtedness, $191,127; other school debts, $34,345. Total general and special county taxes, $263,710; total general and district school taxes, $195,972; total municipal taxes, $41,993; total state taxes, $35,259; total tax (inclusive municipal), per capita, $58.11.

EDUCATIONAL—Number graded schools, 86; enrollment, 1,961. Number high schools, 2; enrollment, 299.

BUSINESS STATISTICS—Number of railroads, 2; railway mileage, exclusive spurs and sidetracks, 77.77. Number of manufactures, 11; average number wage earners, 205; value of products, $706,126. Number of banks, 7. Number general stores, 21; confectionery, etc., 6; groceries and meats, 15; lumber yards, 7; total number merchants, 171. Total assessed valuation 1922 merchandise, $570,001. Number grain elevators, 13; total capacity, 417,000 bushels. Number creameries, 1. Number flour mills, 1. Number of lawyers, 12. Number of physicians, 7.

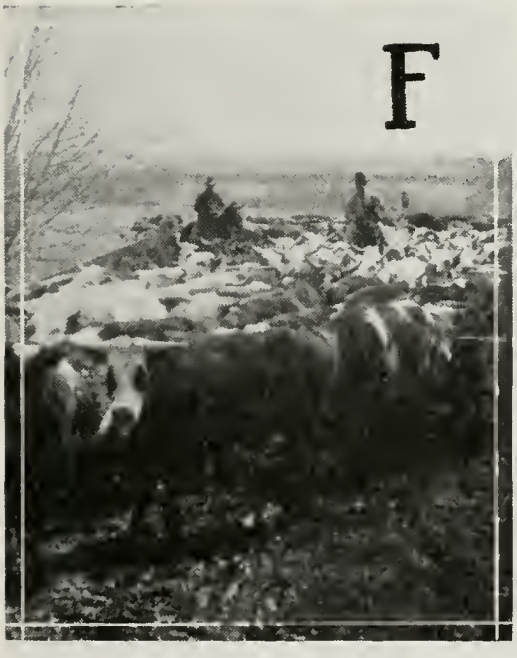
AGRICULTURE (1920 census)—Number farms, 1,195; farm acreage, 747,993; improved farm acreage, 298,620; irrigated acreage, 1,674; average value all property per farm, $13,692. Livestock assessed 1922—number cattle, 19,656; number sheep, 12,236; number horses, 15,234; number swine (census), 2,214.

CLIMATOLOGICAL DATA—At Glendive. Elevation, 2,091. Average date last killing frost in spring, May 14; average date first killing frost in fall, September 22.

	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Ave. Prec.	.64	.52	.98	1.12	2.3	3.18	1.78	1.41	1.33	.88	.51	.60	15.25
Ave. Temp.	13.4	14.2	27.2	46.2	55.9	65.8	72.2	70.4	58.5	46.9	30.6	19.6	43.4

County Seat, Glendive. Population County Seat, 3,816.
County Agricultural Agent—No.

PRAIRIE COUNTY



FOR many years in the old range days having the reputation of being the largest livestock shipping point in the northwest, Terry, the county seat of Prairie county, is looking forward to the time when it will again be an important shipping point under present conditions—of hogs and cattle fattened on the corn crop of the county which is rapidly expanding in acreage. Livestock continues to be the dominant industry, but crop production, in value, is not far behind.

Prairie county is situated in east central Montana, with a maximum length from the northwest to the southeast of about 75 miles, and an avearge width of 25 miles. The Yellowstone River flows across the south half from the southwest to the northeast. The Powder River comes in from the south near the western side and O'Fallon Creek is the largest stream on the eastern side. Brackett, Cedar and Cherry Creeks flow into the Yellowstone from the north. The northwestern part of the county is occupied by a low range called Mountain Sheep Bluffs. Upland

rolling prairies sloping away from the Yellowstone valley embrace the largest areas. Soil types on the uplands range from sandy to clay loams. The lower valley soils are mostly heavy clay loams.

Increase Livestock Holdings

For almost half a century this was in the heart of the range stock region and the industry was conducted on an extensive scale. The grazing areas were broken up by the homesteading movement in 1905-1910 and with few exceptions the old-time cattle empires have been divided into smaller farms. Non-irrigated farming prevails. Spring wheat is the chief cash corp, with corn and summer fallow as the alternate cropping system used in rotations. The low elevation and the long growing season are favorable to corn, which does well on both the bottom and the uplands, producing good yields of both fodder and grain. Since corn became a standard crop, there has been a pronounced interest taken in hog growing, and the county is establishing a reputation as a producer of pure-bred swine. The trend at present is to increase all livestock holdings so as to provide a cash market for corn. There is a co-operative livestock shipping association.

Engineers estimate 52,000 acres in Yellowstone and Powder River valleys can be irrigated. A pumping project is contemplated looking to the reclamation of 125,000 acres along the Yellowstone in Custer, Rosebud, Prairie and Dawson counties.

There are extensive areas underlain with coal, which has been commercially mined in a limited way for home markets. Natural gas has been found on Cabin Creek, in the eastern part of the county.

The main line of the Chicago, Milwaukee & St. Paul enters the county in the southeastern quarter, and runs northwesterly to Terry on the Yellowstone River, which it follows westward. The main line of the Northern Pacific parallels the river all the way across the county, as does the National Parks highway from the Twin Cities, while the Yellowstone Trail follows the Milwaukee.

Terry is situated near the geographical center of the county in a natural artesian basin. It is the principal shipping and distributing center and has modern municipal improvements. Mildred is the largest community in the south end of the county. Fallon, on the Northern Pacific, is a shipping point for the eastern district.

PRAIRIE COUNTY—Ranks forty-eighth in population (3,684); thirty-ninth in area (1,114,880 acres); thirty-eighth in combined 1922 crop and livestock value; twenty-fourth in 1920 mineral production; forty-first in bank deposits, 1922; forty-second in assessed valuation, 1922. Acres public land, 38,695; acres state land, 58,698.

WEALTH PRODUCTION—Estimated 1922 crop value, $936,700; estimated livestock value, January, 1923, $1,325,700; coal production, 1920, $15,615; total bank deposits, September 15, 1922, $685,144.

TAXATION 1922—Total assessed valuation, $15,433,877; total taxable value, $5,164,374. Total outstanding county bond indebtedness, $147,500; total outstanding county warrant indebtedness, $584; total outstanding school bond indebtedness, $87,181; other school debts, $4,017. Total general and special county taxes, $92,463; total general and district school taxes, $100,521; total municipal taxes, $14,035; total state taxes, $24,669; total tax (inclusive municipal), per capita, $62.89.

EDUCATIONAL—Number graded schools, 49; enrollment, 841. Number high schools, 2; enrollment, 73.

BUSINESS STATISTICS—Number of railroads, 2; railway mileage, exclusive of spurs and sidetracks, 76.72. Number of manufactures, 4; average number wage earners, 6; value of products, $27,738. Number of banks, 4. Number general stores, 6; confectionery, etc., 4; groceries and meats, 4; lumber yards, 4; total number merchants, 55. Total assessed valuation 1922 merchandise, $197,985. Number grain elevators, 5; total capacity, 120,000 bushels. Number of lawyers, 5. Number of physicians, 2.

AGRICULTURE (1920 census)—Number farms, 673; farm acreage, 548,989; improved farm acreage, 126,134; irrigated acreage, 486; average value all property, per farm, $15,307. Livestock assessed 1922—number cattle, 14,258; number sheep, 23,560; number horses, 10,156; number swine (census), 999.

CLIMATOLOGICAL DATA—At Fallon. Elevation, 2,211 feet. Average date last killing frost in spring, May 27; average date first killing frost in fall, September 18.

	No. Yrs. Record	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Ave. Prec.	11	.35	.19	.31	.48	2.7	3.29	1.02	1.69	1.23	.95	.34	.22	13.69
Mean Temp.	12	10.4	15.1	30.3	45.7	52.8	63.4	70.4	68.1	58.7	.45	32.9	17.7	42.5

County Seat, Terry. Population County Seat, 794.

County Agricultural Agent—Yes.

McCONE COUNTY

WHEN the rails are laid across the gap between Richey on the east and Lewistown on the west of the line projected by the Great Northern, the greatest need of McCone county, in east central Montana, will be filled. Lack of transportation facilities has retarded development of its resources, the most important of which are agricultural. A noted pastoral region in the old range days, stock raising still continues to be the dominant pursuit. Large areas of fertile land, coupled with an average annual precipitation considerably higher than in most parts of eastern Montana, have attracted many farmers into the region. When transportation facilities are improved, it is believed the development of the county will be rapid.

From the Missouri River, its northern boundary, McCone county extends southerly about 55 miles, and easterly from Big Dry Creek about 40 miles. The Redwater river rises in the southern end and runs northeasterly across a corner of Dawson county and then back into McCone county, joining the Missouri at the northwestern corner. While there are some rough and broken areas, most of the county is tillable, consisting of rolling uplands and flat benches. Soil types vary from a clay loam in the valleys to a sandy loam on the benches. Non-irrigated farming is followed almost exclusively, but there are a number of opportunities for the construction of small irrigation systems. The net irrigable land in the county is estimated at 20,000 acres.

More progress has been made farming in the eastern and northern parts of the county, the distance to market being less than in other districts. Spring wheat is the leading cash crop. Oats and flax are next in importance, flax being the easiest to transport and carrying the highest value of any of the small grains. Corn is assuming an important place in the cropping system, producing an abundance of fodder and fair yields of grain. A creamery at Circle reflects the interest manifested in diversified farming. The swine industry is growing. As long as shipping distances remain so great the livestock industry on a range basis will flourish.

Corn and Hogs

Lignite coal abounds in many places. It is expected the region will be explored for oil and gas.

Richey, the present terminus of the Great Northern's new projected line across Montana, lies 12 miles east of McCone's eastern border. Being the nearest rail point for a large McCone county area, it is the most important distributing and shipping point. The southern part of the county finds an outlet through Terry, on both the Milwaukee and the Northern Pacific railways, while the northern district reaches the main line of the Great Northern across the Missouri at Wolf Point and Poplar.

Circle, the county seat, in the south central part, is the largest town. Brockway, 12 miles south of Circle, is the second largest town. Both are on the line of the proposed railroad.

McCONE COUNTY—Ranks thirty-ninth in population (4,747); twenty-first in area (1,692,800 acres); thirtieth in combined 1922 crop and livestock value; thirty-third in 1920 mineral production; forty-seventh in bank deposits, 1922; forty-first in assessed valuation, 1922. Acres public land, 119,945; acres state land, 85,440.

WEALTH PRODUCTION—Estimated 1922 crop value, $1,409,500; estimated livestock value, January, 1923, $1,650,000; coal production, 1920, $1,800; total bank deposits, September 15, 1922, $355,763.

TAXATION 1922—Total assessed valuation, $16,194,937; total taxable value, $4,870,423. Total outstanding county bond indebtedness, $124,900; total outstanding county warrant indebtedness, $43,962; total outstanding school bond indebtedness, $76,818; other school debts, $20,008. Total general and special county taxes, $119,508; total general and district school taxes, $94,972; total municipal taxes, $721; total state taxes, $23,621; total tax (inclusive municipal), per capita, $50.31.

EDUCATIONAL—Number graded schools, 67; enrollment, 906. Number high schools, 2; enrollment, 69.

BUSINESS STATISTICS—Number of manufactures, 5; average number wage earners, 3; value of products, $61,305. Number of banks, 4. Number general stores, 15; confectionery, etc., 1; groceries and meats, 1; total number merchants, 38. Total assessed valuation 1922 merchandise, $69,416. Number grain elevators, 1; total capacity, 35,000 bushels. Number creameries, 2. Number flour mills, 1. Number of lawyers, 6. Number of physicians, 1.

AGRICULTURE— (1920 census)—Number farms, 1,284; farm acreage, 668,686; improved farm acreage, 229,566; irrigated acreage, 400 (estimated); average value all property, per farm, $9,143. Livestock assessed 1922—number cattle, 16,475; number sheep, 27,132; number horses (estimated), 17,297; number swine (census), 1,676.

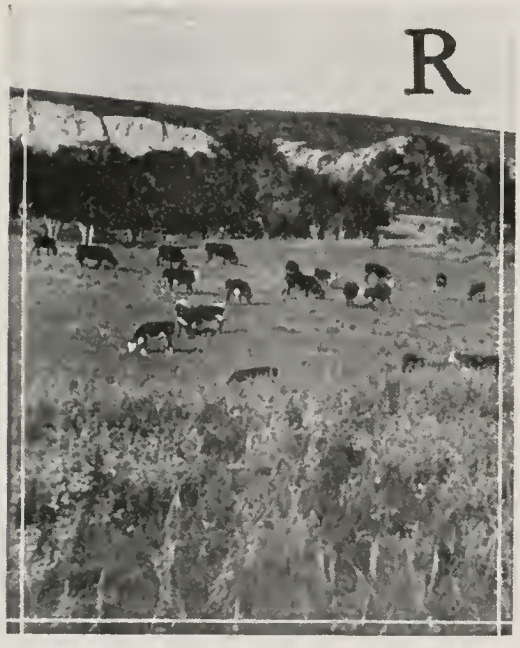
CLIMATOLOGICAL DATA—At Springbrook (near Circle). Elevation, 2,800 (estimated) feet. Average date last killing frost in spring, May 28; average date first killing frost in fall, September 16.

	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Ave. Prec.	.98	.93	1.50	1.20	2.36	4.49	1.83	1.66	1.27	1.07	.75	1.02	19.06
Ave. Temp.	14.1	15.3	27.7	43.7	52.8	62.9	68.6	67.4	57.6	45.6	31.9	19.3	42.2

County Seat, Circle. Population County Seat, 452.

County Agricultural Agent—No.

GARFIELD COUNTY



RICH in potential resources, but handicapped by lack of rail facilities, Garfield county, in east central Montana, is confident that when this handicap is overcome, it will take the rank to which its area and possibilities entitle it. Livestock growing is the most important industry and will continue to be until marketing facilities are provided that place the county on an equality with other regions. Oil has been discovered in the west end. It has large beds of coal, and the existence of large deposits of iron is reported. There are more than half a million acres of public land in the county.

Garfield county is approximately 80 miles long, east and west, and 65 miles wide, north and south. It is bounded on the west by the Musselshell River and on the north by the Missouri River. Big Dry Creek runs northerly along the eastern boundary, emptying into the Missouri. Artesian flows of water have been developed in some districts at depths of 150 to 175 feet. The soil types in the Missouri and Musselshell valleys and the brakes back of them, range from clay to heavy clay that require timely and careful handling. More sandy loams are found on the uplands which, for the most part, are fertile and yield good returns.

While small grains such as wheat, oats, barley and rye and early acclimated varieties of corn do well, the long hauls to rail points make this type of farming unprofitable. The most successful farmers are devoting their attention to products that can be marketed on foot or in a concentrated form. For instance, on the bottom lands of the Missouri River and in a few places on the uplands, alfalfa seed production has been undertaken and because of favorable soil and climatic conditions combined with small bulk, comparatively high value and ease of transportation has become an important cash crop. A start in swine raising has been made by some farmers who are growing corn. The hogs are fattened on corn, dressed, hauled to the railroad and expressed to Montana cities. There are a considerable number of range herds of cattle and sheep in the county, the areas of broken and bad lands in the western and northern part affording good grazing.

Marketing A Problem

Coal abounds in all parts of the county. Some oil has been discovered in the west end of the county, east of the Musselshell river, in the Cat Creek district. It is reported that Smoky Butte, a dome-shaped eminence nine miles southwest of Jordan, about a mile square and rising about 500 feet above the surrounding plain, is a solid mass of iron ore. Much meteoric iron has been picked up in the vicinity. The existence of beds of clay, chalk and of potash in the county are also reported, but so far as known, no geological examination of the county's mineral resources has been made.

The only industrial plant is a small flour mill at Jordan.

The Great Northern has surveys running through the middle of the county for the so-called Mondak cut-off. It has been built west from Mondak as far as Richey and the grade and necessary tunnels have been completed from Lewistown east nearly to the western boundary of Garfield county. It is believed that the gap of about 150 miles will be completed as soon as financial conditions permit. At present the southeastern quarter of the county finds an outlet through a stage from Jordan to Miles City; the trade of the northeastern part of the county goes to Glasgow; of the northwestern part to Malta, and of the western part to Winnett, Fergus county.

Railroad Is Projected

Jordan, the county seat, is the largest community and the principal trading center. Many small trading centers are scattered throughout the region.

The Snow Creek Game Preserve, along the Missouri River, in the northern part of the county, created through the efforts of W. T. Hornaday of the New York Zoological Society, is as remarkable for its weird scenery as for its wild game, which includes species that are almost extinct. The scenery in Hell Creek Canyon is pronounced as romantically attractive as some of the best found in the national parks. The old west of cowboys and cattle still flourishes in parts of Garfield county.

GARFIELD COUNTY—Ranks thirty-sixth in population (5,368); eighth in area (3,095,680 acres); twenty-fourth in combined 1922 crop and livestock value; fiftieth in bank deposits, 1922; fortieth in assessed valuation, 1922. Acres public land, 580,833; acres state land, 157,373.

WEALTH PRODUCTION—Estimated 1922 crop value, $1,023,900; estimated livestock value, January, 1923, $2,216,000; total bank deposits, September 15, 1922, $195,118.

TAXATION 1922—Total assessed valuation, $16,293,093; total taxable value, $4,908,630. Total outstanding county bond indebtedness, $234,500; total outstanding county warrant indebtedness, $34,939; total outstanding school bond indebtedness, $31,096; other school debts, $15,233. Total general and special county taxes, $171,547; total general and district school taxes, $115,831; total municipal taxes, $864; total state taxes, $24,092; total tax (inclusive municipal), per capita, $58.18.

EDUCATIONAL—Number graded schools, 86; enrollment, 1,052. Number high schools, 2; enrollment, 62.

BUSINESS STATISTICS—Number of manufactures, 5; average number wage earners, 3; value of products, $33,770. Number of banks, 2. Number general stores, 14;

groceries and meats, 5; lumber yards, 1; total number merchants, 36. Total assessed valuation 1922 merchandise, $69,537. Number flour mills, 1. Number of lawyers, 5. Number of physicians, 3.

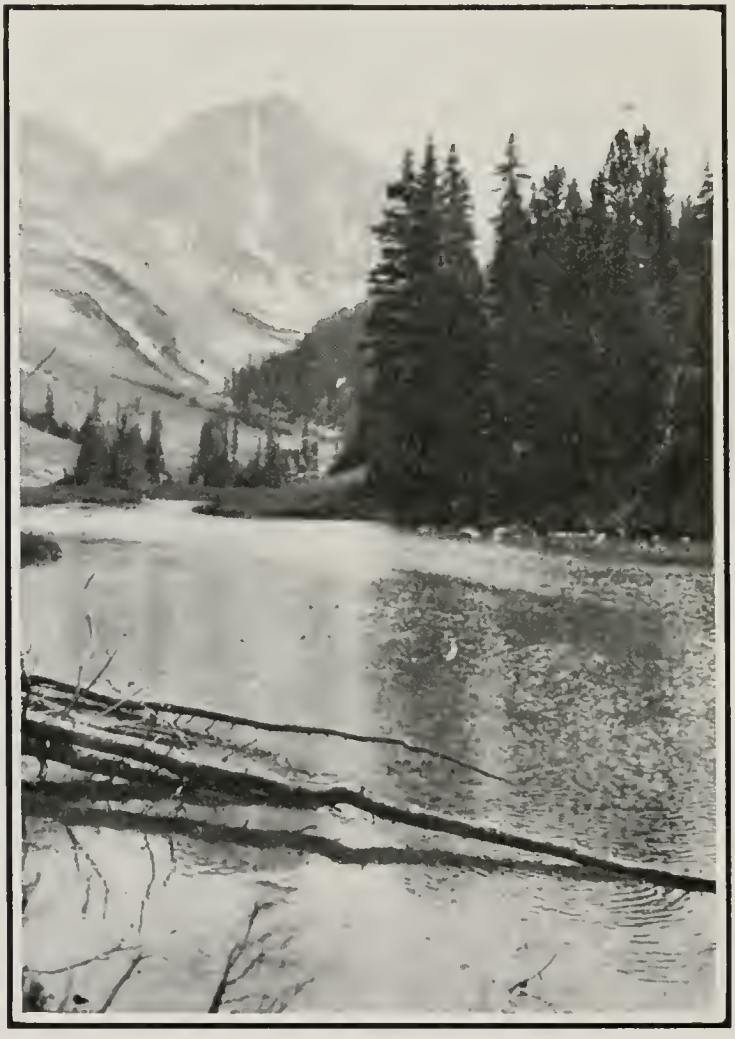
AGRICULTURE (1920 census)—Number farms, 1,532; farm acreage, 874,129; improved farm acreage, 136,554; irrigated acreage, 370; average value all property, per farm, $8,951. Livestock assessed 1922—number cattle, 22,145; number sheep, 68,569; number horses, 15,413; number swine (census), 1,460.

CLIMATOLOGICAL DATA—At Jordan. Elevation, 2,800 (estimated) feet. Average date last killing frost in spring, May 19; average date first killing frost in fall, September 19.

	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Ave. Prec.	.74	.61	.60	.76	2.07	2.77	1.64	1.05	.83	.67	.22	.67	12.63
Ave. Temp.	12.7	16.2	29.8	42.9	51.8	62.8	71.4	70.4	57.1	46.3	30.5	18.3	42.5

County Seat, Jordan. Population County Seat, 813.

County Agricultural Agent—No.



CENTRAL MONTANA

In Developed Energy Resources Stands in First Place—Most of Its Area Included Within the Mountain Region—Stockraising and General Farming Varied Industrial Development.

Originally a mining and a stockraising region, Central Montana, which extends from the Musselshell river on the east to the crest of the continental divide on the west, and includes the counties of Fergus, Musselshell, Golden Valley, Wheatland, Judith Basin, Meagher, Cascade, Lewis and Clark, Broadwater and Jefferson, is one of the principal industrial regions of the state. Mining, stockraising and general farming are also important. Diversified agriculture is better established in the western two-thirds, or eastern slope district, than in the eastern third of the plains region.

The district ranks first in production of petroleum, in tonnage of coal mined and in developed hydro-electric power. In undeveloped water power it is second. Because of the wheat acreages of Fergus and Judith Basin counties it holds second place on this crop. It also ranks second on potatoes and alfalfa. In the western half are many national forests and other grazing areas. There is much irrigated land.

Zinc, silver, lead, gold and sapphires are mined, as well as coal. The existence of large deposits of commercial iron ore and other minerals of industrial importance are reported. This district is the chief producer of gypsum products.

Three of the larger cities are here. There has been considerable industrial development, which is emerging from the extractive into the processing stage. Elevations 3,100 to 5,000 feet; growing season three to nearly four months.

MUSSELSHELL COUNTY

COAL mining is the principal industry, but the records would seem to indicate the dominant characteristic of Musselshell county is a pioneering spirit. In 1919 venturesome persons drilled in Devil's Basin field of the county and succeeded in finding some oil. While the field has not yet attained commercial importance, this discovery induced the exploration of other districts whose successful development placed Montana on the oil map of the nation. In March, 1923, the first carload of Montana steers fattened on Montana corn to be shipped to market came from this county, blazing a path that will help to restock the non-irrigated farms in the old grazing areas.

Situated on the rolling bench lands of central Montana, the principal topographic features of Musselshell county are the Bull Mountains, near the southern border, and the Musselshell River, which flows

through the middle of the county and then abruptly turns to the north and defines the north half of the eastern border. The maximum length, east and west, is 55 miles, and the maximum breadth about 44 miles. There is some irrigated farming along the bottom lands of the Musselshell valley, and it is estimated an additional 20,000 acres in the county can be irrigated.

North of the Musselshell there are chiefly rolling bench lands, devoted to non-irrigated farming. South of the river the topography is more broken and in what is known as the Pine Hills district mixed grain and stock growing predominates. In the northern half of the county soil types range from sandy loams to clay and heavy clay loams. All of them require careful handling as moisture is usually a controlling factor in crop production. Both winter and spring wheat are grown, the latter being the main cash crop. The region is well adapted to corn, which returns good yields of both grain and fodder.

The average value of the coal production of the county considerably exceeds the combined value of crop and livestock products. The combined daily production of the mines near Roundup is 6,000 to 7,500 tons. It is one of the leading coal districts of the state. One of its mines has the deepest shaft of any coal property west of the Mississippi. Millions of tons of a good grade of coal are awaiting development in the Bull Mountains, but the mines already established have a capacity larger than the present market demand. Considerable drilling for oil is being done in the Devil's Basin and other potential oil fields of the county in the hope that with depth larger flows of lighter grade oil will be encountered. Practically all the present production of oil is used in the fields. Sapphires have been found from time to time in the Arkwright Bench district.

Big Coal Resources

The main line of the Chicago, Milwaukee & St. Paul Railway follows the Musselshell River and is paralleled by a main east and west highway. The Custer Battlefield highway crosses the county north and south.

Roundup, the largest town and county seat, has all modern municipal improvements. The coal mines lie within four miles of the city, which is also an important distributing and shipping point for the farm and stock districts.

Lake Mason, north of Roundup, is one of the noted duck hunting districts of the state.

MUSSELSHELL COUNTY—Ranks twenty-fourth in population (8,330); seventeenth in area (1,224,320 acres); forty-second in combined 1922 crop and livestock value; fourth in 1920 mineral production; twenty-fourth in bank deposits, 1922; thirty-third in assessed valuation, 1922. Acres public land, 3,862; acres state land, 52,966.

WEALTH PRODUCTION—Estimated 1922 crop value, $732,900; estimated livestock value, January, 1923, $1,065,500; coal production, 1920, $3,422,000; 1921 lumber cut, 416 M feet; total bank deposits, September 15, 1922, $1,320,148.

TAXATION 1922—Total assessed valuation, $19,382,385; total taxable value, $7,480,868. Total outstanding county bond indebtedness, $1,174,748; total outstanding county warrant indebtedness, $156,543; total outstanding school bond indebtedness, $244,306; other school debts, $19,665. Total general and special county taxes, $212,854; total general and district school taxes, $234,756; total municipal taxes, $86,740; total state taxes, $35,060; total tax (inclusive municipal), per capita, $68.35.

EDUCATIONAL—Number graded school, 83; enrollment, 2,185. Number high schools, 4; enrollment, 352.

BUSINESS STATISTICS—Number of railroads, 1; railway mileage, exclusive spurs and sidetracks, 55.02. Number of manufactures, 42; average number wage earners, 135; value of products, $625,645. Number of banks, 6. Number general stores, 21; confectionery, etc., 9; groceries and meats, 21; lumber yards, 8; total number merchants, 178. Total assessed valuation 1922 merchandise, $492,197. Number grain elevators, 17; total capacity, 384,000 bushels. Number creameries, 1. Number flour mills, 1. Number saw mills, 3. Number of lawyers, 19. Number of physicians, 11.

AGRICULTURE (1920 csnsus)*—Number farms, 1,604; farm acreage, 999,389; improved farm acreage, 382,159; irrigated acreage, 4,138; average value all property, per farm, $17,996. Livestock assessed 1922—number cattle, 14,509; number sheep, 9,853; number horses, 7,372; number swine (census), 4,309.

CLIMATOLOGICAL DATA—At Roundup. Elevation, 3,184 feet. Average date last killing frost in spring, May 17; average date first killing frost in fall, September 30.

	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Ave. Prec.	.94	.44	.69	.95	2.36	3.62	1.82	.88	1.17	.96	.68	.89	15.40
Ave. Temp.	24.5	24.0	31.8	44.3	51.6	64.1	72.1	66.9	59.7	46.4	35.1	19.3	45.0

County Seat, Roundup. Population County Seat, 2,434.
County Agricultural Agent—No.

*These figures include the territory now in Golden Valley County.

FERGUS COUNTY

LARGEST in area, first in combined crop and livestock value in 1922, first in oil production, an important producer of coal and precious minerals, Fergus county, in the geographical center of Montana, has been richly endowed with diversified resources. A start along industrial lines has been made. Fergus county has a maximum length east and west of 150 miles and a maximum width of 60 miles. The northern and eastern portions are rolling uplands, more or less broken by the brakes along the Missouri River, which marks the northern boundary, and by brakes along the Musselshell River, which defines the eastern boundary. The central and western areas are occupied by mountain ranges, isolated from the main range of the Rockies, considerable portions of which are included within national forests and can be utilized for grazing purposes. There is a wide variation in soil types. In the western half of the county the prevailing type is a sandy loam underlain with a limestone gravel which is fertile. The county is well watered, by both streams and springs. In some districts good artesian flows have been found.

Banner Wheat County

For many years Fergus county has been the banner wheat county of the state in both acreage and production, though this development is largely confined to the western half of the county. Winter wheat is a leading crop. Occasionally winter killing occurs, but most of the time the crop comes through in good shape. Other small grains, such as oats, barley and rye, are widely grown. Corn is a prominent crop in the eastern part of the county and in certain areas of the central and western districts. In regions adjacent to the mountains, and in the broken areas, in the east and north, livestock production has become more general than small grain farming, summer range for moderately sized herds being available on the national forests. In recent years interest has been aroused in a more diversified type of agriculture. Many farmers are taking up dairying and some are establishing pure-bred livestock herds as a supplement to general grain farming. While the irrigated acreage, in comparison with the total improved farm acreage is small, projects have been launched which, when completed, will nearly double the land now under irrigation.

The International Harvester Company is planning the establishment in this county of a farm to carry on a demonstration of the possibilities of diversified farming—more corn, alfalfa, sweet clover and other crops to be consumed on the farm and marketed through livestock or livestock products.

Gold in considerable quantities has long been produced in Fergus county. It has also produced commercially silver, copper, and lead, and annually marketed nearly a million dollars' worth of coal before the creation of Judith Basin county. Many of its coal measures have not been touched. It also has gypsum in big quantities. Other mineral resources some of which are awaiting development, include alabaster, soapstone, brick clay, pottery clay, limestone and sandstone. Natural gas has been found. The county's most valuable mineral resource at present is oil. In the winter of 1920 the first pro-

ducing well was discovered in the Cat Creek field. Three years later there were 110 producing wells in the field which yielded in 1922 more than 2,000,000 barrels of high grade oil. Drilling is being done on many other structures, widely scattered over the county.

There are three oil refineries in the county—two at Lewistown and one at Winnett. Near Hanover is a large cement and stucco plant. Other extractive establishments include large flour mills, creameries, a brick and clay plant, saw mills and monumental works.

Three Oil Refineries

Transportation facilities in the western and southern portions of the county are adequate. The Billings-Great Falls branch of the Great Northern, used as a through line by the Burlington, serves the western district. A branch line of the Chicago, Milwaukee and St. Paul runs through the southwestern part of the county to Lewistown, and another branch runs east out of that city to Winnett. The Great Northern's proposed Mondak cut-off will open the eastern part of the county. The heaviest part of the construction, including tunnels, through this county has been completed. It is thought work, which was suspended at the beginning of the war, will shortly be resumed. The Custer Battlefield highway, from Omaha to the Glacier Park, traverses the county in a northwesterly direction.

Lewistown, the county seat, is a thoroughly modern city, attractively situated on the eastern slope of the Judith Range. It is a distributing and wholesaling point for a large and growing territory. Winnet, in eastern Fergus, has enjoyed a rapid growth in the past two years, due to the development of the oil fields. Winnett, Denton, in the northwestern part, and Moore, in the southwestern part of the county, are the largest towns next to Lewistown.

Moore, Garniel and Straw, on the Milwaukee, south of Lewistown, are in the center of a rich farming section. Buffalo, on the Great Northern, is surrounded by splendid farms and ranches. Hanover has a large cement factory. North of Lewistown lie Roy and Winnifred. Large grain-growing and stock-raising sections are adjacent to them. Kendall, a gold mining camp five miles from Hilger, has produced over $5,000,000 in gold. Grass Range and Teigen lie in eastern Fergus and are surrounded by agricultural and stock-raising country.

FERGUS COUNTY—Ranks fourth in population (25,808); first in area (3,816,960 acres); first in combined 1922 crop and livestock value; sixth in 1920 mineral production; sixth in bank deposits, 1922; fourth in assessed valuation, 1922. Acres public land, 326,705; acres state land, 219,552; acres national forests, 89,331.

WEALTH PRODUCTION—Estimated 1922 crop value, $4,604,700; estimated livestock value, January, 1923, $4,546,000; metal production, 1920, $137,567; coal production, 1920, $859,114; 1921 lumber cut, 99,000 feet; total bank deposits, September 15, 1922, $6,579,556.

TAXATION 1922—Total assessed valuation, $70,301,471; total taxable value, $22,690,451. Total outstanding county bond indebtedness, $1,947,000; total outstanding county warrant indebtedness, $319,132; total outstanding school bond indebtedness, $987,762; other school debts, $198,435. Total general and special county taxes, $541,627; total general and district school taxes, $534,900; total municipal taxes, $120,743; total state taxes, $107,437; total tax (inclusive municipal) per capita, $50.55.

EDUCATIONAL—Number graded schools, 214; enrollment, 4,864. Number high schools, 11; enrollment, 1,251.

BUSINESS STATISTICS—Number of railroads, 2; railway mileage, exclusive spurs and sidetracks, 231.12. Number of manufactures, 84; average number wage earners, 319; value of products, $1,802,493. Number of banks, 19. Number general stores, 58; confectionery, etc., 27; groceries and meats, 46; lumber yards, 21; total number merchants, 509. Total assessed valuation, 1922 merchandise, $1,815,988. Number grain elevators, 57; total capacity, 1,441,000. Number creameries, 2. Number flour mills, 4. Number saw mills, 8. Number of lawyers, 53. Number of physicians, 24. Developed hydro-electric plant capacity, 1,050 horse power.

AGRICULTURE (1920 census)*—Number farms, 4,226; farm acreage, 2,573,981; improved farm acreage, 1,037,819; irrigated acreage, 33,499; average value all property per farm, $22,223. Livestock assessed 1922—number cattle, 57,711; number sheep, 62,883; number horses, 27,610; number swine (census), 11,089.

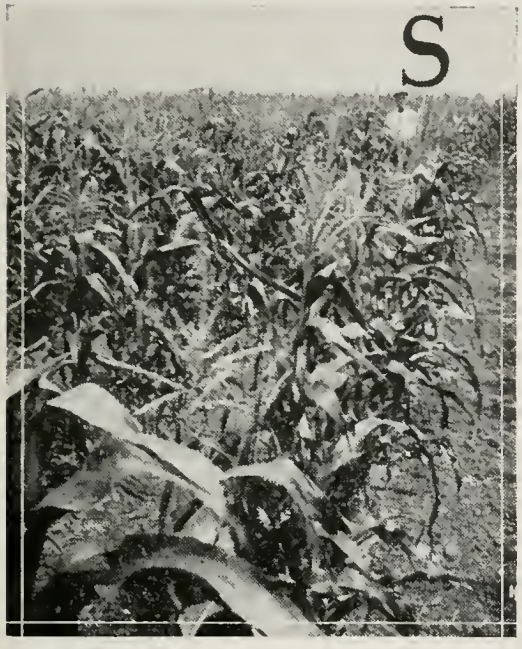
CLIMATOLOGICAL DATA—At Lewistown. Elevation 3,950. Average date last killing frost in spring, May 29; average date first killing frost in fall, September 7.

	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Ave. Prec.	.80	.82	1.08	1.39	3.05	3.54	2.42	1.35	1.61	1.26	.79	.78	18.89
Ave. Temp.	20.7	22.8	30.0	42.2	50.1	58.2	64.3	62.8	53.3	44.6	32.2	25.5	42.2

County seat, Lewistown. Population county seat, 6,120.
County Agricultural Agent—Yes.

*These figures include most of Judith Basin, which was created from Fergus and Cascade counties.

GOLDEN VALLEY COUNTY



SITUATED in central Montana, most of its area included within the Musselshell valley drainage system, Golden Valley county is almost wholly agricultural in character, although it has large coal measures and prospects of petroleum. One of the more recently settled districts, the one-crop system has been dominant, but a wider interest in dairying and an expanding acreage in corn are indicative of the emergence of a more stable type of farming. A project is under way looking to the irrigation of more than 22,000 acres of land near Franklin.

Outside of the Musselshell valley most of the county consists of rolling bench lands gradually sloping away to the Snowy Mountains on the north and to the Pine Hills region on the south. Eighty-five per cent of the county, it is estimated, is tillable. Soil types are quite uniform. The uplands range from sandy to clay loams, with the lower bottom valleys clay to heavy clay soils.

Except in the Musselshell valley, where some irrigated farming is done, non-irrigated farming prevails. While all small grains do well, spring wheat is the primary grain crop. The growing season is hot and good results have been had with corn, particularly as a feed crop. Cream buying stations that have been established in the past year or two at several points reflect the growing interest in a mixed type of farming. Moisture is the controlling factor in crop production, especially in the northern part of the county, necessitating careful cultural practices to insure good crops.

Corn Does Well

The commercial production of coal is small, and confined to fuel for local needs. The existence of alabaster is reported from the north end of the county. Five potential oil structures have been mapped by geologists and some drilling has been done.

The main line of the Chicago, Milwaukee & St. Paul Railway follows the Musselshell river east and west through the county, and the Billings-Shelby line of the Great Northern, which is used by Burlington trains to the coast, goes northwesterly through the county. The Buffalo highway, from Cody, Wyoming, to the Glacier Park, crosses the county in a northerly direction, and a main east and west automobile highway winds through the Musselshell valley.

Ryegate, on the Milwaukee, is the county seat. Lavina, Franklin and Belmont are trading centers on the railroads.

GOLDEN VALLEY COUNTY—Ranks forty-third in population (4,276); forty-ninth in area (752,000 acres); forty-third in combined 1922 crop and livestock value; forty-sixth in bank deposits, 1922; forty-third in assessed valuation, 1922. Acres public land, 7,063; acres state land, 41,023; acres national forests, 23,570.

WEALTH PRODUCTION—Estimated 1922 crop value, $808,100; estimated livestock value, January, 1923, $941,000; 1921 lumber cut, 130 M feet; total bank deposits, September 15, 1922, $468,463.

TAXATION 1922—Total assessed valuation, $14,995,705; total taxable value, $5,281,964. Total outstanding county bond indebtedness, $475,000; total outstanding county warrant indebtedness, $90,186; total outstanding school bond indebtedness, $129,172. Total general and special county taxes, $122,526; total general and district school taxes, $118,941; total municipal taxes, $16,282; total state taxes, $24,931; total tax (inclusive municipal), per capita, $66.11.

EDUCATIONAL—Number graded schools, 37; enrollment, 695. Number high schools, 4; enrollment, 121.

BUSINESS STATISTICS—Number of railroads, 2; railway mileage, exclusive spurs and sidetracks, 68. Number of banks, 5. Number general stores, 12; groceries and meats, 4; lumber yards, 6; total number merchants, 62. Total assessed valuation 1922 merchandise, $162,485. Number grain elevators, 6; total capacity, 144,000 bushels. Number flour mills, 1. Number saw mills, 1; Number of lawyers, 3. Number of physicians, 1.

AGRICULTURE (Estimated)—Number farms, 1,000; farm acreage, 645,103; irrigated acreage, 3,500. Livestock assessed 1922—number cattle, 12,769; number sheep, 8,884; number horses, 6,417.

CLIMATOLOGICAL DATA—At Yale. Elevation, 3,638 feet—Ryegate. Average date last killing frost in spring, June 10; average date first killing frost in fall, September 11.

	No. Yrs. Record	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Normal Prec.		.78	.61	1.36	1.22	1.96	1.67	1.69	.53	.69	.68	.97	.67	12.83
Mean Temp.	11	22.3	23.1	28.1	41.3	49.6	57.4	64.8	64.7	53.6	43.3	31.6	27.2	42.2

County Seat, Ryegate. Population County Seat, 405.

County Agricultural Agent—No.

WHEATLAND COUNTY

STOCK raising, irrigated and non-irrigated farming are the leading pursuits of Wheatland county. Its principal town, Harlowton, is a railroad division and junction point and is favorably situated to command the trade of a considerable region which has led to the establishment of industries there based upon the primary resources of the region. Considerable drilling for oil is being done. Many acres of land are already irrigated and reclamation of much more is projected.

The county lies in central Montana. The Big Belt and Big Snowy mountains mark its northern border, and the lower levels of the Crazy Mountains extend over into the southwestern part. The Musselshell river runs east and west through the middle of the county, and receives the drainage of many tributaries from both the north and the south. Gently rolling plains extend back from the valleys to the foothills of the mountains. The county is about 45 miles long, east and west, and 36 miles wide.

Soil types on the bottom lands vary from clay to heavy clay loams, underlain in most parts with a gravelly limestone substance. There is greater variation on the bench lands and foothills, the soils ranging from sandy to gravelly loams, which are rich in limestone. A peculiar subsoil is found in a comparatively small area of the northeastern district, impervious, and lying in some instances within six inches of the surface. It does not permit storage of much reserve moisture, and unless three or four feet of surface soil cover it, grain farming is not apt to be successful. Soil borings will easily and quickly determine the conditions that exist.

Farming and Livestock

Most of the western part is devoted to cattle and sheep raising. The steers from one ranch in the southwestern part have consistently, for the past ten years, been the top cattle from Montana on the Chicago market. The bottom lands of the Musselshell river and of its tributaries are largely under irrigation. Preliminary steps for the reclamation of an additional 23,000 acres have been taken. Non-irrigated farming is the prevailing type in the eastern part of the county. Spring wheat is the chief crop of the county, followed in order by tame hay, wild hay, winter wheat, oats, corn and flax. Alfalfa is the chief crop in the irrigated districts, providing winter forage for the livestock raised. On the non-irrigated bench lands sweet clover has been found satisfactory as a forage crop and the acreage devoted to it is expanding. Dairying is also growing in favor.

Coal is the only mineral known to exist, but it is believed deposits of gypsum occur near the Big Snowy Mountains and there are several domes in the central and eastern parts of the county that are being drilled for oil.

At Harlowton is one of the largest flour mills in the state, which gives the county fourth rank in total milling capacity. A creamery there draws from a large territory. A small oil refinery is operated at Hedgesville.

Transportation facilities are good. The main line of the Chicago, Milwaukee & St. Paul follows the Musselshell River through the middle of the county. Harlowton, in the geographical center of the county, is a division point where the electrified portion of the road across the mountains begins. The Lewistown-Great Falls branch runs north out of Harlowton across the county. The Billings-Great Falls-Shelby line of the Great Northern quarters the northeastern district. Highways give direct connection with points north and south and also east and west.

Harlowton is the county seat, and modern in all respects. Two Dot and Shawmut are trade centers on the line of the Milwaukee, and Judith Gap and Hedges on the Great Northern.

Fishing and hunting are found in the mountains along the northern border and in the southwestern district.

WHEATLAND COUNTY—Ranks thirty-fourth in population (5,619); forty-fourth in area (903,040 acres); thirty-third in combined 1922 crop and livestock value; twenty-sixth in bank deposits, 1922; eighteenth in assessed valuation, 1922. Acres public land, 1,714; acres state land, 55,121; acres national forests, 58,512.

WEALTH PRODUCTION—Estimated 1922 crop value, $1,021,000; estimated livestock value, January, 1923, $1,974,000; 1921 lumber cut, 340 M feet; total bank deposits, September 15, 1922, $1,245,386.

TAXATION 1922—Total assessed valuation, $23,597,769; total taxable value, $7,870,429. Total outstanding county bond indebtedness, $295,000; total outstanding county warrant indebtedness, $13,840; total outstanding school bond indebtedness, $114,820; other school debts, $10,341. Total general and special county taxes, $160,431; total general and district school taxes, $154,577; total municipal taxes, $39,278; total state taxes, $36,407; total tax (inclusive municipal), per capita, $69.53.

EDUCATIONAL—Number graded schools, 39; enrollment, 1,103. Number high schools, 1; enrollment, 197.

BUSINESS STATISTICS—Number of railroads, 2; railway mileage, exclusive spurs and sidetracks, 93.86. Number of manufactures, 15; average number wage earners, 173; value of products, $1,430,565. Number of banks, 8. Number general stores, 13; confectionery, etc., 3; groceries and meats, 19; lumber yards, 7; total number merchants, 140. Total assessed valuation 1922 merchandise, $396,108. Number grain elevators, 7; total capacity, 215,000 bushels. Number creameries, 2. Number flour mills, 1. Number saw mills, 3. Number of lawyers, 10. Number of physicians, 4.

AGRICULTURE (1920 census)—Number farms, 688; farm acreage, 589,827; improved farm acreage, 205,076; irrigated acreage, 14,478; average value all property, per farm, $26,881. Livestock assessed 1922—number cattle, 24,542; number sheep, 56,059; number horses, 6,036; number swine (census), 2,486.

CLIMATOLOGICAL DATA—At Harlowton. Elevation, 4,160 feet. Average date last killing frost in spring, June 7; average date first killing frost in fall, September 4.

	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Ave. Prec.	.78	.68	.80	.95	2.22	2.31	1.51	.71	1.28	.77	.81	.61	13.43
Ave. Temp.	19.4	21.9	29.9	40.8	49.0	57.9	62.8	61.3	50.8	44.9	30.8	23.6	41.1

County Seat, Harlowton. Population County Seat, 1,856.
County Agricultural Agent—No.

JUDITH BASIN COUNTY

NUMEROUS small towns and many big grain elevators in the eastern and northern parts of Judith Basin county reflect the prominence of agriculture. Sapphire and some gold, silver and copper mining characterize the southwestern region, while at Lehigh, in the geographical center of the county, coal mining is important. The annual production of sapphires from this county exceeds in value the output of precious stones of all the rest of the United States. Large deposits of good iron ore are awaiting development. For a while at least it is probable that the development of this county will be more along agricultural than industrial lines.

Judith Basin county lies in central Montana, with a maximum length and breadth of about 50 miles. The crest of the Little Belt range of mountains defines its southern and the Highwood mountains most of its northern boundary. Numerous small streams, rising in the Little Belt mountains, flow northeasterly through the county. Springs are numerous and good well water is found at depths of 15 to 75 feet. Most of the agricultural areas are rolling bench lands on which limestone soil types predominate, while sandy and clay loams are found along the foothills extending to the mountains.

Non-irrigated farming is generally followed, the acreage of irrigated lands being relatively small. The Judith Basin district occupies the eastern portion of the county and extends into Fergus county. It has long enjoyed a reputation as one of the leading wheat producing centers of the state. In 1922 Judith Basin county ranked eighth in wheat production. Wheat, both winter and spring, is the leading cash crop, and good yields are usually obtained. The records of the U. S. Weather Bureau show the annual precipitation is greater than over most of the plains regions of the state. The elevation of the agricultural areas is about 4,000 feet. Except for fodder, corn is not generally grown. Alfalfa and timothy give good yields on the valley lands. Oats, barley and rye are staple crops. The lighter soils on the benches require careful tillage methods to prevent soil blowing which sometimes causes trouble. In localities adjacent to the mountains, livestock raising is the chief agricultural activity, with small grain farming secondary. There has been a gradual change throughout the county in recent years toward a more diversified system of farming and many farms are now carrying small herds of pure-bred livestock as a supplement to general farming. A little more than a fourth of the area of the county is included within national forests which afford summer grazing.

The Judith Basin

The sapphire production of the county averages in value about $200,000 a year. The output is regulated, however, by the market demand. Coal takes second place. Large coal measures exist in the county but the main operation is at Lehigh. Mining for gold, silver and copper is being done on a small scale. It is probable that eventually the iron deposits in this county will rank as the most important mineral resources, the proximity of coal and limestone being factors calculated to influence their development.

Coal, Iron and Jewels

The Billings-Shelby line of the Great Northern, used by the Burlington for its transcontinental trains, runs northwesterly through the heart of the agricultural districts, and is paralleled by the Custer Battlefield highway. At Junction, near the western boundary, a branch line runs east to Lewistown which eventually will be extended east, making an alternative transcontinental line.

The branch line of the Chicago, Milwaukee & St. Paul to Great Falls skirts the south half of the eastern border, dips east into Fergus county and then runs northwesterly near the northern border.

Stanford, the county seat, and Hobson are the largest towns. Other towns are Mendon, Moccasin, Windham, Spion Kop, Geyser, Benchland, Utica and Lehigh.

Attractive scenery is found in the mountains in the southwestern part of the county. The sapphire mines on Yogo Creek, 25 miles southwest of Hobson, are of interest to tourists.

JUDITH BASIN COUNTY—Ranks forty-second in population (4,283); thirty-sixth in area (1,179,520 acres); twelfth in combined 1922 crop and livestock value; thirty-first in bank deposits, 1922; fifteenth in assessed valuation, 1922. Acres public land, 7,434; acres state land, 57,425; acres national forests, 304,170.

WEALTH PRODUCTION—Estimated 1922 crop value, $1,841,900; estimated livestock value, January, 1923, $2,228,000; metal production, 1920, figures not available; 1921 lumber cut, 30 M feet; total bank deposits, September 15, 1922, $1,099,351.

TAXATION 1922—Total assessed valuation, $26,940,663; total taxable value, $8,626,310. Total outstanding county bond indebtedness, $360,000; total outstanding county warrant indebtedness, $10,255; total outstanding school bond indebtedness, $73,242; other school debts, $16,714. Total general and special county taxes, $133,537; total general and district school taxes, $183,453; total municipal taxes, $5,788; total state taxes, $41,263; total tax (inclusive municipal), per capita, $84.99.

EDUCATIONAL—Number graded schools, 58; enrollment, 1,623. Number high schools, 5; enrollment, 286.

BUSINESS STATISTICS—Number of railroads, 2; railway mileage, exclusive spurs and sidetracks, 103.13. Number of banks, 12. Number general stores, 19; confectionery, etc., 6; groceries and meats, 8; lumber yards, 7; total number merchants, 156. Total assessed valuation 1922 merchandise, $361,298. Number grain elevators, 26; total capacity, 670,000 bushels. Number flour mills, 2. Number saw mills, 1. Number of lawyers, 5. Number of physicians, 5.

AFRICULTURE (1920 census)*—Farm acreage, 802,840; irrigated acreage, 18,000 acres (estimated). Livestock assessed 1922—number cattle, 27,346; number sheep, 30,645; number horses, 9,036.

CLIMATOLOGICAL DATA—At Utica. Elevation, 5,000 feet. Average date last killing frost in spring, May 26; average date first killing frost in fall, September 18.

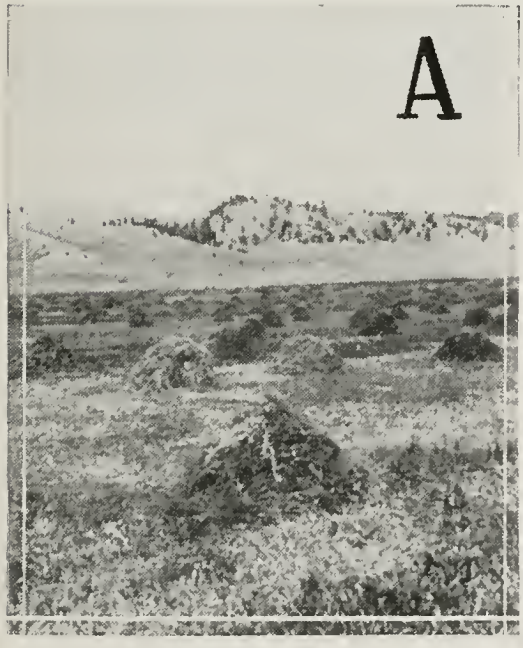
	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Ave. Prec.	.65	.38	.80	1.17	2.83	3.39	2.10	1.19	1.38	1.15	.81	.58	16.43
Ave. Temp.	23.0	24.1	29.9	42.1	49.4	58.0	64.8	64.6	54.6	45.0	34.3	26.8	43.0

County Seat, Stanford. Population County Seat, 300.

County Agricultural Agent—No.

*Included in Cascade and Fergus Counties.

MEAGHER COUNTY



A NOTED stock-raising region in the early days, with some mining, Meagher county, in central Montana, has been little affected by the passing of time. Natural conditions are such that the stock industry, in one form or another, will probably continue to be the major agricultural pursuit. Mining operations have declined, but the undeveloped mineral resources justify the conclusion the time will come when the industry will be revived on a larger scale than in the past. Ideally adapted to dairying, pronounced progress has been made in this branch of the livestock industry in the past few years, and many of the farmers in the lower valleys and on the non-irrigated benches are re-arranging their farm methods to make it a major enterprise. Mountain and grazing lands occupy most of the area of the county, which extends to the crest of the Big Belt mountains

on the southwest, and to the crest of the Little Belt mountains on the northeast. Between these ranges lies the Smith River and many smaller valleys. In the southern part the Castle Mountains, an isolated range, rise. The Crazy Mountains, another isolated range, extend over from the south in the southeastern corner. This part of the county is in the Musselshell river drainage system. Practically all the farming land is in the southern and eastern parts.

Farming is confined to the lower valleys and bench lands, the higher lands being devoted to forage and grazing purposes. Both irrigated and non-irrigated farming is done, and it is estimated an additional 20,000 acres can be reclaimed at reasonable cost. Spring wheat is the chief grain crop. Oats and barley, generally grown for seed, yield well. Alfalfa is the principal forage crop under irrigation. Moisture is the controlling factor of crop production on the non-irrigated lands and its successful conservation requires that careful cultural practices be followed. Rapid progress is being made in dairying. In the past two years more than a thousand dairy cows have been shipped into the county. The largest dairy barn in the state is located in the county. A creamery was opened in 1923 at White Sulphur Springs which furnishes a home market for the new industry. More than a fourth of the county's area is included within national forests which furnish summer grazing. The range sheep industry is more important than the range cattle business. Some of the largest stock-growing outfits in the state operate in Meagher county.

Take Up Dairying

Meagher county has produced in commercial quantites gold, silver, copper, and lead. There are large deposits of iron ore in the northern part of the county, which are reported to be of high grade, but not enough development has been done to determine their economic value. Oil shale, manganese and coal are also found. There are three well defined structures in the county which may be valuable for oil. The Ringling structure and the Potter Basin structure are being drilled (1923).

The main line of the Chicago, Milwaukee and St. Paul traverses the southern part of the county, and a branch line from Ringling runs to White Sulphur Springs, 18 miles north. The eastern Park-to-Park highway, from the Gardiner entrance of Yellowstone Park to the Glacier entrance of Glacier Park, crosses the county north and south, and there is also an east and west highway via Harlowton, Ringling and Helena.

White Sulphur Springs, one of the old established towns of Montana, is the county seat. It is well built, modern, and for many years was rated as one of the richest towns, per capita, in the state. Ringling is a shipping and distributing point for a considerable area.

Scenery, fishing and big game hunting in season are among the county's tourist attractions. The springs after which the town of White Sulphur is named are reputed to be of high curative value. They are owned by the Ringling family of circus fame and their development into a resort has been projected.

MEAGHER COUNTY—Ranks fifty-second in population (2,622); twenty-ninth in area (1,516,160 acres); twenty-third in combined 1922 crop and livestock value; thirty-first in 1920 mineral production; forty-fifth in bank deposits, 1922; thirty-eighth in assessed valuation, 1922. Acres public land, 5,400; acres state land, 82,984; acres national forests, 437,933.

WEALTH PRODUCTION—Estimated 1922 crop value, $586,400; estimated livestock value January, 1923, $2,761,700; metal production, 1920, $2,756; 1921 lumber cut, 168 M feet; total bank deposits September 15, 1922, $585,439.

TAXATION 1922—Total assessed valuation, $16,652,620; total taxable value, $5,277,487. Total outstanding county bond indebtedness, $447,000; total outstanding county warrant indebtedness, $41,616; total outstanding school bond indebtedness, $111,891; other school debts, $240. Total general and special county taxes, $121,850; total general and district school taxes, $76,903; total municipal taxes, $11,331; total state taxes, $26,015; total tax (inclusive municipal), per capita, $90.04.

EDUCATIONAL—Number graded schools, 28; enrollment, 414. Number high schools, 2; enrollment, 76.

BUSINESS STATISTICS—Number of railroads, 2; railway mileage, exclusive spurs and sidetracks, 72.27. Number of manufactures, 11; average number wage earners, 43; value of products, $105,204. Number of banks, 4. Number general stores, 10; confectionery, etc., 5; groceries and meats, 5; lumber yards, 4; total number merchants, 59. Total assessed valuation 1922 merchandise, $217,368. Number grain elevators, 3; total capacity, 45,000 bushels. Number creameries, 1. Number saw mills, 8. Number of lawyers, 6. Number of physicians, 2. Developed hydro-electric plant capacity, 75 horse power.

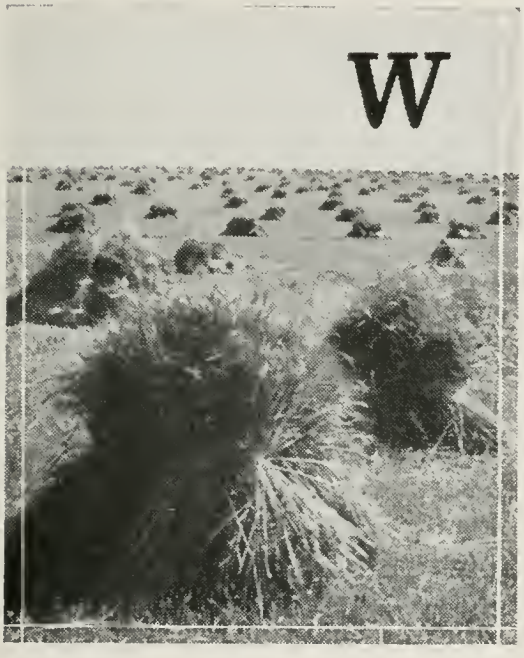
AGRICULTURE (1920 census)—Number farms, 447, farm acreage, 801,801; improved farm acreage, 136,839; irrigated acreage, 25,075; average value all property, per farm, $33,815. Livestock assessed 1922—number cattle, 21,654; number sheep, 123,652; number horses, 5,028; number swine (census), 1,575.

CLIMATOLOGICAL DATA—At White Sulphur Springs. Elevation 5,280 feet. Average date last killing frost in spring, June 2; average date first killing frost in fall, September 4.

	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Ave. Prec.	.34	32	.38	.82	1.43	1.99	1.59	.81	1.30	.70	.39	.46	10.53
Ave. Temp.	21.2	22.6	27.9	40.2	47.8	56.8	62.5	61.2	50.4	41.2	31.6	21.7	40.4

County Seat, White Sulphur Springs. Population County Seat, 574.
County Agricultural Agent—No.

CASCADE COUNTY



WITH mountains in its back-yard and rolling uplands in its front, Cascade county, in central Montana, is not only strategically located, but by reason of a variety of natural resources is looking forward to a multiple-industry development along manufacturing, commercial and agricultural lines. In popoulation it is the second largest county in the state, ranks among the first ten in combined crop and livestock production, and, in developed hydro-electric power and also value of manufactured products, outstrips all other counties. Some of its most important natural resources have scarcely been touched. Great Falls, in this county, is the second largest city in the state.

Cascade county is about 60 miles long, east and west, and 54 miles wide, north and south. The south half, which is mostly mountainous, is chiefly devoted to livestock raising and metal mining; the north half, which consists of rolling uplands, to farming and coal mining. The soils vary, ranging from clay silt to sandy loam with a clay sub-soil. The Missouri River runs diagonally through Cascade county, with a sudden descent over a series of falls and rapids, from the mountains to the southwest, and with a more gradual flow toward the northeastern boundary, below the Great Falls. Flowing from the north and west is Sun River, which has its conflux with the Missouri at the city of Great Falls. The Dearborn and Smith Rivers also traverse Cascade county, flowing into the Missouri River. Another fertile valley is formed by Belt Creek, a stream which heads in the Little Belt Mountains and flows north 100 miles, emptying into the Missouri near Great Falls.

In the Sun and Missouri River valleys there are approximately 56,000 acres now under irrigation with a possibility of expanding it to 128,000 acres. Alfalfa, oats, barley and potatoes are the chief crops on irrigated farms, while wheat is the predominating crop in the non-irrigated areas. In the central and southeastern areas of the county winter wheat is grown to some extent which normally produces good yields. Many of the non-irrigated sections are below the average

altitude of the county—3,400 feet— which makes it possible to produce corn both for forage and grain. In six years the land in corn grew from eleven acres to five thousand acres. There is considerable truck gardening near Great Falls.

Wide Variety of Minerals

Coal has been the chief mineral product of the county. In the number of coal mines operated, it ranks first. It is also an important producer of silver, lead and zinc and has commercially produced gold and copper. There has been some development of its brick clay, fire clay and gypsum resources and of limestone and sandstone for building purposes. It also has iron, mica and manganese deposits. The iron deposits are extensive, and, because of the proximity of process materials and of power, are perhaps the most valuable undeveloped resource. Drilling for oil is under way at several places in the county.

Great Falls is one of the important distributing and commercial districts of the state and the financial center of northern Montana. It is headquarters for most of the oil companies operating in the northern Montana oil fields. In the variety and magnitude of its manufacturing enterprises it is the most important city in the state. Approximately 160,000 horse power has been developed on the Missouri at Great Falls with additional undeveloped sites in reserve. The industries include copper and zinc refineries, oil refineries, a copper rod, wire and cable mill, a ferro-manganese plant, flour milling, brick and clay products, a packing plant, four creameries, the largest railroad shops on the Great Northern between St. Paul and Hillyard, Washington, and metal and wood working plants.

No county has better rail transportation facilities. It is served by the Great Northern, the Chicago, Milwaukee & St. Paul and the Burlington. Nine branch lines tap the agricultural and mineral regions. Great Falls is on the Montana link of the National Park-to-Park highway, the Grand Canyon to Banff highway, the Cutser Battlefield and the Buffalo Trail highways. Large sums have been expended on gravel-surfaced trunk line roads.

A Modern Community

Great Falls, the principal city of northern Montana, is noted for its civic pride. It has 30 miles of street and alley pavements, 20 miles of boulevard, 725 acres of parks and playgrounds, a half million dollar municipally-owned water system, a public natatorium and a city market. It has two daily newspapers, 40 factories, three large hotels, six banks, a country club and golf course. Cascade, in the western part of the county, is a good town in a rich agricultural district. Sand Coulee and Stockett are coal mining camps. Neihart and Monarch metal mining camps. Belt and Armington are trading centers in the non-irrigated districts in the northeastern part of the county.

Great Falls takes its name from the cascades of the Missouri at that place that were so designated by Lewis and Clark on their exploration of the Louisiana purchase. Giant springs, near the falls, one of the largest fresh water springs in the world, was also discovered by the explorers. Excellent fishing and hunting is to be found in the mountains in the western and southern parts of the county.

CASCADE COUNTY—Ranks second in population (37,145); twentieth in area (1,758,720 acres); tenth in combined 1922 crop and livestock value; third in 1920 mineral production; third in bank deposits, 1922; second in assessed valuation, 1922. Acres public land, 19,834; acres national forests, 185,667.

WEALTH PRODUCTION—Estimated 1922 crop value, $1,582,500; estimated livestock value, January, 1923, $2,832,000; metal production, 1920, $825,515; coal production, 1920, $2,679,000; 1921 lumber cut, 45 M feet; total bank deposits, September 15, 1922, $11,616,865.

TAXATION 1922—Total assessed valuation, $107,713,498; total taxable value, $33,057,441. Total outstanding county bond indebtedness, $1,781,000; total outstanding county warrant indebtedness, $18,819; total outstanding school bond indebtedness, $552,050; total general and special county taxes, $622,174; total general and district school taxes, $529,749; total municipal taxes, $317,523; total state taxes, $153,416; total tax (inclusive municipal), per capita, $43.69.

EDUCATIONAL—Number graded schools, 102; enrollment, 6,473. Number high schools, 6; enrollment, 1,471.

BUSINESS STATISTICS—Number of railroads, 2; railway mileage, exclusive spurs and sidetracks, 257.96. Number of manufactures, 86; average number wage earners, 2,129; value of products, $59,443,547. Number of banks, 15. Number general stores, 34; confectionery, etc., 85; groceries and meats, 127; lumber yards, 23; total number merchants, 944. Total assessed valuation 1922 merchandise, $5,264,223. Number grain elevators, 28; total capacity, 1,120,000 bushels. Number creameries, 4. Number flour mills, 5. Number saw mills, 3. Number of lawyers, 96. Number of physicians, 50. Developed hydro-electric plant capacity, 130,815 horse power.

AGRICULTURE (1920 census)*—Number farms, 1,703; farm acreage, 1,252,282; improved farm acreage, 378,035; irrigated acreage, 14,864; average value all property, per farm, $29,309. Livestock assessed 1922—number cattle, 29,594; number sheep, 75,159; number horses, 10,608; number swine (census), 6,367.

CLIMATOLOGICAL DATA—At Great Falls. Elevation, 3,350 feet. Average date last killing frost in spring, May 8; average date first killing frost in fall, September 24.

	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Ave. Prec.	.68	.56	.83	1.21	2.48	3.29	1.69	1.07	1.40	.89	.74	.62	15.46
Ave. Temp.	23.4	24.7	33.1	45.9	53.5	61.6	68.5	66.5	56.8	47.7	35.6	28.7	45.5

County Seat, Great Falls. Population County Seat, 24,121.
County Agricultural Agent—Yes.

*These census figures include the territory now in Judith Basin county.

BROADWATER COUNTY

SMALL in area but possessing diversified resources, development in Broadwater county has proceeded along the lines of live-stock raising, irrigated and non-irrigated farming, and mining. It has several undeveloped hydroelectric sites, in connection with one of which on the Missouri River the irrigation of a large acreage is contemplated. It has extensive but undeveloped marble deposits which are reported to be of unusually high grade. There has been a revival in mining recently.

Broadwater county is situated in central Montana with a maximum length, north and south of 60 miles and a maximum width east and west of 30 miles. The crest of the Big Belt range of mountains marks its eastern border, and the Elkhorn range a portion of its western border. Considerable areas in both the eastern and western districts are included within the Helena National Forest which furnish good summer grazing for many herds of both cattle and sheep. The Missouri River valley runs northerly through the county. The soils in this valley, and also in the Crow Creek valley, which is the second important irrigated district, vary from a black loam to a gravelly loam. In the extreme southern section of the county, soil conditions are different from those in the Missouri River valley. For the most part the soil types are sandy loams which require careful handling to prevent soil blowing. The rainfall is also limited, necessitating careful cultural practices to conserve the moisture supply.

Extensive irrigation systems are in operation and are being further developed along the Missouri River bottom lands and its tributaries. In the central and northern portions irrigated farming predominates. Alfalfa is grown as a feed crop and both winter and spring wheats as primary cash grain crops. Oats, barley and rye are also grown. Practically the same crops are produced on the non-irrigated foothills which join the mountains and gradually slope away to the lower valley lands. Corn is grown in the lower valleys primarily as a feed crop.

Two Kinds of Farming

The good summer range in the national forests and the areas too rough for cultivation make the region especially fitted to livestock production. Small stockmen have organized several co-operative range bull associations. On many of the smaller farms are found splendid herds of pure-bred hogs. Broadwater county has long held a leading place in swine production. One of the finest Hereford herds in the country, and the one that produced the grand champion bull at the 1922 International show in Chicago, is located in this county. In the irrigated regions considerable attention is paid to dairying.

Several Mining Districts

In the west central part of the county, in the foothills of the Elkhorn range, at Radersburg and Winston, there is considerable quartz mining. On Confederate Gulch, in the northeastern part of the county, which in early days was one of the big gold placer camps of Montana, large scale dredging operations have been resumed to extract values left by the pioneer miners. This county has commercially produced gold, silver, copper and lead. It also has coal and marble, gems and precious stones. Industries include lumbering on a small scale, flour milling and the manufacture of butter.

Rail facilities are good. The main line of the Northern Pacific follows the Missouri river and is paralleled by a trunk line highway. The Chicago, Milwaukee and St. Paul goes through the southern end of the county.

Townsend, the county seat, situated in the geographical center of the county, is the principal town. Other towns are Toston, Radersburg, Winston, Lombard and Canton.

The scenery is attractive in the mountainous regions and the hunting and fishing good.

BROADWATER COUNTY—Ranks fiftieth in population (3,239); forty-seventh in area (771,840 acres); forty-first in combined 1922 crop and livestock value; eighteenth in 1920 mineral production; forty-second in bank deposits, 1922; forty-fifth in assessed valuation, 1922. Acres public land, 48,856; acres state land, 22,128; acres national forests, 148,630.

WEALTH PRODUCTION—Estimated 1922 crop value, $891,000; estimated livestock value, January, 1923, $1,215,000; metal production, 1920, $56,811; 1921 lumber cut, 95 M feet; total bank deposits, September 15, 1922, $669,114.

TAXATION 1922—Total assessed valuation, $12,693,834; total taxable value, $4,206,019. Total outstanding county bond indebtedness, $267,859; total outstanding county warrant indebtedness, $6,849; total outstanding school bond indebtedness, $87,400; other school debts, $1,586. Total general and special county taxes, $126,563; total general and district school taxes, $79,601; total municipal taxes, $12,951; total state taxes, $20,149; total tax (inclusive municipal), per capita, $73.87.

EDUCATIONAL—Number graded schools, 31; enrollment, 552. Number high schools, 1; enrollment, 115.

BUSINESS STATISTICS—Number of railroads, 2; railway mileage, exclusive spurs and sidetracks, 60.26. Number of manufactures, 5; average number wage earners 16; value of products, $771,103. Number of banks, 3. Number of general stores, 10; confectionery, etc., 2; groceries and meats, 4; lumber yards, 4; total number merchants, 65. Total assessed valuation 1922 merchandise, $195,466. Number grain elevators, 5; total capacity, 140,000 bushels. Number creameries, 1. Number flour mills, 1. Number saw mills, 4. Number of lawyers, 6. Number of physicians, 3.

AGRICULTURE (1920 census)—Number farms, 466; farm acreage, 299,428; improved farm acreage, 107,744, irrigated acreage, 25,733; average value all property per farm, $23,794. Livestock assessed 1922—number cattle, 13,753; number sheep, 28,324; number horses, 4,661; number swine (census), 2,853.

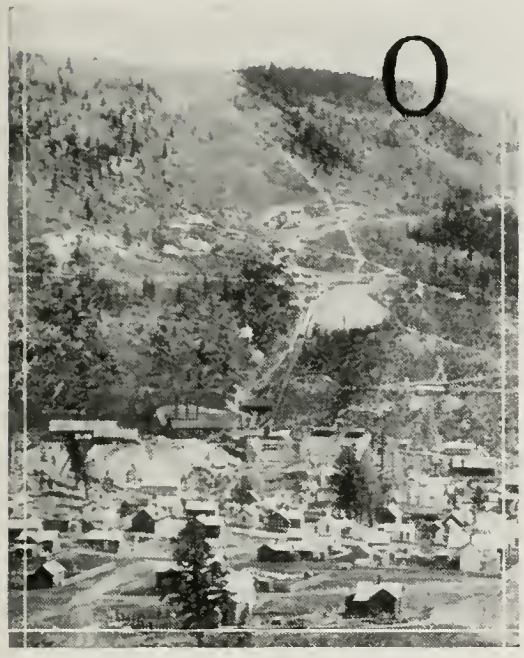
CLIMATALOGICAL DATA—At Toston. Elevation, 3,905 feet. Average date last killing frost in spring, June 1; average date first killing frost in fall, September 6.

	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Norm. Prec.	.24	.44	.38	.61	1.73	2.23	1.21	.68	1.13	.60	.47	.60	10.32
Mean Temp.	24.4	25.7	32.8	43.2	52.0	57.6	64.9	64.4	54.7	44.9	32.2	23.3	43.3

County seat, Townsend. Population county seat, 897.

County Agricultural Agent—No.

LEWIS AND CLARK COUNTY



ONE of the original counties of the territory of Montana, brought into being on the wealth of its placer gold and further developed through its quartz treasures, there is every indication that the mining industry of Lewis and Clark county is on the verge of a revival, and that Marysville, Rimini, Unionville, Scratch Gravel and other old-time camps will again be important producers of lead-silver and gold-silver ores. While mining has been the most important industry, stock raising has also been extensively followed, and in recent years agriculture has advanced, but the tillable area in proportion to the county's total area is small. Helena, the county seat, is also the state capital.

Situated in central Montana, the dominant topographic feature of Lewis and Clark county is the main range of the Rocky Mountains, the crest of which defines more than half of the western boundary, which is upwards of 100 miles in length. Midway, north and south, the range swings easterly toward the middle of the county, placing a portion of its area on the Pacific slope side. The county is about 40 miles in width, and in the southeastern quarter is flanked on the east by the Big Belt Mountains. The only considerable expanse of open country is in the northeastern part, though there are some larger valleys which give way to bench lands before meeting the mountains.

The Missouri River flows northerly through the south half of the county and many good-sized tributaries, whose source is in the continental divide and the Big Belt range, empty into it. On the western slope of the county the headwaters of the Big Blackfoot River rise. On the Missouri River are the large power plants. In developed horse power the county ranks second.

Adapted to Livestock

Because the topography of the county naturally fits large areas for livestock production, this industry is about four times as important as agriculture. Only about half the area of the county is in private ownership. Sheep are run in large bands by big concerns, for the most part, but the cattle are in herds seldom larger than 200 to 400 animals, owned by stock farmers who live in the mountain valleys. The chief farming areas are in the northern part of the county around Augusta and in the Prickly Pear valley at Helena. Alfalfa hay, small grains, and potatoes are the principal crops. Near Helena there are specialized truck and poultry farms. While the irrigated acreage is variously estimated from 33,000 to 46,000 acres, the non-irrigated acreage is larger with spring wheat, oats, barley and rye as the leading crops. The average elevation of the farming area is 4,000 feet. Some good yields of corn have been obtained on non-irrigated lands. That part of the county lying on the western slope of the mountains is devoted almost wholly to stock raising and mining. There is considerable acreage of irrigated land awaiting settlement.

Minerals are the most important undeveloped resources of the county, in the opinion of many persons. The camp of Marysville produced $30,000,000, all above a depth of 1,600 feet. Upwards of $10,000,000 were taken from the Unionville

district, south of Helena, while the placers of Last Chance Gulch, now the main street of Helena, yielded $16,000,000. While the district is an old one, there are many promising claims awaiting exploration and development. There has been no change in the situation since the state mining engineer in his biennial report for 1911-1912 said: "The Rimini district and the districts adjacent to Helena afford great opportunities for investments. These districts merit more attention from the mining public than they have so far been accorded. . . . I am strongly of the opinion that were a limited amount of capital judiciously expended in the development of these several districts, as good mines as have been found in the state would be discovered. All that is necessary is for capital to become interested in the proper development of the many hundreds of promising bearing prospects." The county has produced commercially gold, silver, copper, lead and zinc. It also has sapphires, phosphate, fluorite, marble, brick and fire clay, dimension and structural slate and much building stone. Coal is reported to exist. More than 800,000 acres of the county are in national forests. The lumber output is small, the cut being principally poles, lagging and cordwood.

Many Public Offices

The only custom silver-lead smelter in the state is located at East Helena, while at Helena are manufacturies for the production of biscuits and crackers, candy, coffee and tea, mining machinery and structural steel, farm machinery, ornamental lighting standards, brick, tile and terra cotta, dairy products, soap, glycerine, store and office fixtures, granite and marble works, tents and awnings and large book and job printing establishments. Helena is an important jobbing center, chiefly in hardware, groceries, men's clothing and automobiles. There are many public offices, in addition to the state offices, located at Helena. These include a branch of the Federal Reserve Bank of the Ninth district and fourteen federal offices of a state-wide character, besides the United States Veterans' Bureau, the U. S. Veterans' Hospital at Fort Harrison, and the War Finance Corporation, and several other federal district offices. It is asserted there are more federal than state employes in Helena.

The main line of the Northern Pacific crosses the southern part of the county, the Havre-Butte branch of the Great Northern runs north and south, and another Great Northern branch out of Great Falls has its terminus at Augusta, in the northern area. A main east and west highway crosses the county; the middle route of the Park-to-Park highway, from the Gardiner entrance of Yellowstone to the eastern portal of Glacier Park, runs north and south and is also a link in the Banff-Grand Canyon road.

Helena, the largest city, situated on the southern rim of the Prickly Pear valley, was founded as a mining camp in 1864. It has developed into an attractive residential community, and besides being the governmental center is also the financial center of the state. The state fair is held at Helena each fall. Among other institutions of a state-wide character located here are the State Girls' Vocational School, the Odd Fellows' Home, the Masonic Home, the Montana Children's Home Society, the St. Joseph's Orphan Home, the House of the Good Shepherd and the Florence Crittenden Home.

Two denominational colleges are located at Helena, Mount St. Charles, under Catholic auspices, and the Intermountain Union College. The last named was under Methodist auspices the past 20 years, but in 1923 a merger was effected with the Presbyterians. The only veterans' vocational school in the state is maintained at Helena. Fort Harrison, three miles west of Helena, has been converted into a veterans' hospital of 300 beds for tuberculosis patients.

Besides the smelter at East Helena, the town also serves a considerable agricultural district. Augusta is the principal town in the northern end of the

county. Marysville and Rimini are mining camps. Lincoln, on the western slope of the Rockies, attractively situated on the Big Blackfoot, is the most favored location in the county for the erection of summer homes.

There are many beautiful mountain drives out of Helena. Two miles from the city are the Broadwater Hot Springs where the largest covered hot water plunge in the world has been erected. The Gates of the Mountains, on the Missouri River, where the stream has cut a gorge hundreds of feet deep for many miles through limestone rock, were named by Lewis and Clark. Fishing streams abound and in the western and northern parts of the county there is big game hunting.

LEWIS AND CLARK COUNTY—Ranks sixth in population (18,660); fourteenth in area (2,206,080 acres); twenty-fifth in combined 1922 crop and livestock value; ninth in 1920 mineral production; second in bank deposits, 1922; fifth in assessed valuation, 1922. Acres public land, 115,904; acres state land, 105,376; acres national forests, 809,379; acres military reservation, 1,799.

WEALTH PRODUCTION—Estimated 1922 crop value, $983,500; estimated livestock value, January, 1923, $2,246,700; metal production, 1920, $496,894; 1921 lumber cut, 340 M feet; total bank deposits, Sept. 15, 1922, $12,895,822.

TAXATION 1922—Total assessed valuation, $58,855,369; total taxable value, $17,060,000. Total outstanding county bond indebtedness, $635,000; total outstanding county warrant indebtedness, $12,692; total outstanding school bond indebtedness, $696,400; other school debts, $11,731. Total general and special county taxes, $286,187; total general and district school taxes, $358,485; total municipal taxes, $176,634; total state taxes, $79,725; total tax (inclusive municipal), per capita, $48.28.

EDUCATIONAL—Number graded schools, 60; enrollment, 2,467. Number high schools, 3; enrollment, 604. Other institutions, Mt. St. Charles College; Intermountain Union College, Helena; also State Vocational School for Girls, Helena; also Veterans' Vocational School, Helena.

BUSINESS STATISTICS—Number of railroads, 2; railway mileage, exclusive spurs and sidetracks, 133.98. *Number of manufactures, Helena only, 52; average number wage earners, 539; value of products, $3,016,238. Number of banks, 10. Number general stores, 19; confectionery, etc., 42; groceries and meats, 59; lumber yards, 6; total number merchants, 429. Total assessed valuation 1922 merchandise, $2,495,055. Number grain elevators, 5; total capacity, 94,000 bushels. Number creameries, 2. Number flour mills, 1. Number saw mills, 4. Number of lawyers, 73. Number of physicians, 22. Developed hydro-electric plant capacity, 87,335 horse power.

AGRICULTURE (1920 census)—Number farms, 816; farm acreage, 754,135; improved farm acreage, 132,576; irrigated acreage, 33,226; average value all property, per farm, $20,887. Livestock assessed 1922—number cattle, 29,786; number sheep, 58,138; number horses, 5,734; number swine (census), 3,378.

CLIMATOLOGICAL DATA—At Helena. Elevation, 4,110 feet. Average date last killing frost in spring, May 9; average date first killing frost in fall, September 28.

	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Ave. Prec.	.94	.67	.77	1.06	2.15	2.32	1.14	.70	1.25	.90	.72	.77	13.39
Ave. Temp.	20.3	23.0	32.2	43.8	51.4	59.6	67.0	66.1	55.7	45.4	32.7	26.0	43.6

County Seat, Helena. Population County Seat, 12,037.

County Agricultural Agent—Yes.

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*Statistics on the number of manufactures, average number wage-earners and the value of products are not available for the county, the 1920 census grouping Lewis and Clark, Deer Lodge and Treasure counties together so as not to disclose the operations of individual establishments. The combined figures for the three counties are: Number of establishments, 83; average number wage earners, 3,445; value of products, $44,560,516. By far the larger number of wage earners, and much of the value of the product can be credited to the operations of the Anaconda Copper Mining Company at Anaconda.

JEFFERSON COUNTY

IN THE variety and value of its metal production over a period of years, Jefferson is probably the second most important county in the state. Though small in area and population, it ranked seventh in mineral production in 1920. Mining likely always will be its premier industry. Large areas of the county are hilly and mountainous, making it naturally adapted to range livestock. More than a third of the area is included within national forests which provide good summer grazing. The tillable areas are relatively small, and while there are good farming districts in the county, the livestock industry is the predominant agricultural enterprise.

Jefferson county, in central Montana, stretches east from the crest of the main range of the Rocky Mountains about 40 miles; its northern boundary is not far from the city limits of Helena and its most extreme southerly point not far from the confluence of the Boulder river with the Jefferson. The western half of the county is wooded and mountainous.

Irrigated farming is confined principally to the Boulder and smaller mountain valleys and also to the Whitehall district in the southern part of the county. Hay is the chief crop. In the southeastern part of the county there is some non-irrigated farming with wheat as the primary crop, and moisture the chief factor controlling crop production. In the irrigated district around Whitehall farmers have specialized in potatoes and dairying, the location being especially favorable from which to reach the Butte market.

Millions of dollars have been taken from the lead-silver ores of the Corbin, Wickes, Elkhorn and other mining districts in the northern part of the county.

Large Mineral Wealth

Much gold and some copper and zinc have also been produced commercially. Other mineral resources include gypsum, phosphate, manganese, platinum, gems, fire clay, limestone and granite for building purposes. The wings of the State Capitol at Helena were constructed of Jefferson county granite. Considerable mining development is projected at a number of districts in the county and indications are there will be more activity in the near future than for several years past. Arrangements looking to the re-opening of many old-time producers are under consideration and interest is being evinced in many new and little developed properties.

Rail facilities are excellent. The main lines of the Chicago, Milwaukee & St. Paul and the Northern Pacific cross the south end of the county; the Northern Pacific main line via Helena touches the north end, and the Butte-Havre branch of the Great Northern runs northerly through the western part of the county. Transcontinental and north and south highways parallel the railroads.

Boulder, near the geographical center of the county, is the seat of government, the principal livestock shipping point, and is also important in a mining as well as tourist way. Whitehall is the center of the irrigated farming district, and, being the junction for a Northern Pacific branch southerly into Madison county, is also a good trade center. Sappington, in the southeast corner, is the junction point for another Northern Pacific branch that taps the Madison river districts in Madison county.

Many Hot Springs Resorts

There are many pleasure and hot springs resorts in Jefferson county. The Pipestone Hot Springs, near Whitehall, the Boulder Hot Springs, at Boulder, and the Alhambra Hot Springs, in the north end of the county—all have modern hotels, large plunges, individual cabins and other tourist attractions. One of the two national monuments in Montana is the Lewis and Clark cavern, in the southeastern part of the county. It is said to rival Mammoth Cave in beauty and impressiveness.

JEFFERSON COUNTY—Ranks thirty-seventh in population (5,203); forty-first in area (1,044,480 acres); forty-sixth in combined 1922 crop and livestock value; seventh in 1920 mineral production; forty-fourth in bank deposits, 1922; thirty-sixth in assessed valuation, 1922. Acres public land, 51,602; acres state land, 25,556; acres national forests, 448,014; acres other federal reservations, 160.

WEALTH PRODUCTION—Estimated 1922 crop value, $619,400; estimated livestock value, January, 1923, $908,600; metal production, 1920, $928,484; 1921 lumber cut, 1,186 M feet; total bank deposits, September 15, 1922, $611,634.

TAXATION 1922—Total assessed valuation, $17,280,292; total taxable value, $6,173,817. Total outstanding county bond indebtedness, $106,570; total outstanding county warrant indebtedness, $24,384; total outstanding school bond indebtedness, $106,100; other school debts, $3,450. Total general and special county taxes, $99,086; total general and district school taxes, $118,683; total municipal taxes, $10,248; total state taxes, $28,991; total tax (inclusive municipal), per capita, $49.39.

EDUCATIONAL—Number graded schools, 40; enrollment, 835. Number high schools, 3; enrollment, 224. Other institutions, State School for Deaf and Blind at Boulder.

BUSINESS STATISTICS—Number of railroads, 3; railway mileage, exclusive spurs and sidetracks, 156.38. Number of manufactures, 10; average number wage earners, 48; value of products, $150,469. Number of banks, 3. Number general stores, 12; confectionery, etc., 12; groceries and meats, 7; lumber yards, 2; total number merchants, 82. Total assessed valuation 1922 merchandise, $239,226. Number grain elevators, 2; total capacity, 57,000 bushels. Number creameries, 1. Number saw mills, 3. Number of lawyers, 4. Number of physicians, 3.

AGRICULTURE (1920 census)—Number farms, 555; farm acreage, 281,494; improved farm acreage, 80,933; irrigated acreage, 24,946; average value all property, per farm, $15,722. Livestock assessed 1922—number cattle, 13,883; number sheep, 3,285; number horses, 3,975; number swine (census), 2,215.

CLIMATOLOGICAL DATA—At Renova. Elevation, 4,360 feet. Average date last killing frost in spring, May 26; average date first killing frost in fall, September 9.

	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Ave. Prec.	.43	.34	.52	1.27	2.19	2.25	1.18	.86	1.35	.94	.45	.31	12.09
Ave. Temp.	24.4	26.4	34.3	43.9	51.0	59.1	65.3	63.7	54.8	45.8	35.6	26.0	44.2

County Seat, Boulder. Population County Seat, 682.

County Agricultural Agent—No.

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WEST CENTRAL MONTANA

Diversified Farming, Fruitgrowing, Lumbering and Smelting Are the Principal Industries—First in Dairying and Potato Production—On the Pacific Slope Side of the Mountains.

A pleasant land of timbered mountains, fertile valleys and clear streams, West Central Montana, lying on the Pacific slope side of the Rocky Mountains, embraces the counties of Powell, Deer Lodge, Granite, Missoula, Ravalli and Mineral counties. The principal industrial activities are smelting, lumbering and mining. Its agriculture is diverse in character and well established. It is one of the principal fruitgrowing regions of the state, ranks first in dairying and potato production and third in tame hay acreage. It ranks second in lumber production. Its smelters at Anaconda are the largest in the world.

In the eastern part of this region, in Powell and Granite counties, stockraising and general farming predominate, while in Ravalli and Missoula counties dairying, horticulture, swine and poultry production are becoming increasingly important. Irrigated farming is the dominant type and the tendency is to reduce the size of the farm units. The Bitter Root, Clark's Fork (or Missoula) and Flathead valleys are the best known farming districts. Two large cities are here.

Lumbering is confined to the western and mining to the eastern and southeastern districts. Granite county produces annually more manganese than all the rest of the United States. Tremendous beds of phosphate are found, which the U. S. G. S. reports are of commercial importance and of higher grade than deposits in the southern states. They have not been developed. Elevations of farming regions, 2,000 to 5,000 feet; growing season under three to more than four months.

POWELL COUNTY

STOCK raising, agriculture and lumber are the principal developed resources of Powell county, which lies in west central Montana, on the western slope of the Rocky Mountains, with the continental divide defining much of its eastern boundary. Mining and many varied tourist attractions are resources that have been developed only to a limited extent.

The county is 90 miles in length, north and south, with an average width of 25 miles. Most of its area is mountainous, but there are large mountain valleys and benchlands in the central and southern districts. The northern part of the county is one of the least explored parts of the state and a noted big game region. The South Fork of the Flathead River rises here and flows north; on the southern slope many streams have their source, which flow south and empty into the Big Black-

foot River, which flows westerly across the middle of the county. The Clark's Fork of the Columbia (locally called the Deer Lodge River), flows north and thence west across the southwestern quarter. It is a well watered, good grass region. In the Deer Lodge valley the stock growing industry of Montana was established.

The farming areas are confined to the south half of the county, in the Deer Lodge valley around Deer Lodge, the Big Blackfoot and Nevada Creek valleys, near Helmville, and the Little Blackfoot valley around Avon. Hay and grain are the principal crops, except in the Deer Lodge valley, where potatoes and truck crops, which find a ready market at Butte and Anaconda, are important. The potato production of the Deer Lodge valley gives the county third place on this crop in counties west of the main range. In the order of their importance, alfalfa leads, followed by wild hay, oats, and then spring wheat. In most districts stock growing is combined with crop production, the national forests, which cover more than a third of the county's area, furnishing fine summer grazing for both cattle and sheep.

Mining in earlier years was an important industry, principally in the southern and eastern parts, and there are still many promising looking properties inviting development. Gold, silver, copper, lead and lime have been produced commercially. Near Elliston a valuable diamond was found. A large part of the county is underlain by high-grade phosphate deposits and it also has beds of coal, marble, brick clay, fire clay, pottery clay and a variety of building stone.

High Grade Phosphate

Deer Lodge is a division point on the Chicago, Milwaukee & St. Paul, which maintains shops there. The largest lime burning plant in the state is at Elliston. Considerable logging and lumbering is carried on.

Railroad transportation is confined to the south end of the county. The main line loops of the Northern Pacific, via Butte and Helena, meet at Garrison. The Milwaukee railroad parallels the Butte line of the Northern Pacific. The main east and west highways via Butte and Helena traverse the county, and a subordinate highway between Missoula and Helena follows the Big Blackfoot River via Ovando and Helmville. The north half of the county is practically virgin mountain wilderness opened only by pack trails of the Forest Service.

Deer Lodge, the county seat, is one of the oldest established towns in Montana, well built and modern. Helmville is the trading center for the Big Blackfoot and Nevada Creek valleys, and Avon for the Little Blackfoot district. Elliston is a mining and logging village. Ovando, as well as Helmville, are outfitting points for hunting parties.

Much of the early history of Montana was made in the Deer Lodge valley. The discovery of gold in this county, on Gold Creek, a few miles west of Garrison, by a half-breed Indian in 1852, launched the first real development of the Montana region. Beautiful scenery and excellent fishing as well as hunting make the county popular with tourists.

POWELL COUNTY—Ranks thirty-first in population (6,909); twenty-fifth in area (1,490,560 acres); thirty-first in combined 1922 crop and livestock value; twentieth in 1920 mineral production; fourteenth in bank deposits, 1922; twenty-fourth in assessed valuation, 1922. Acres public land, 158,018; acres state land, 54,752; acres national forests, 516,098.

WEALTH PRODUCTION—Estimated 1922 crop value, $1,231,500; estimated livestock value, January, 1923, $1,779,500; metal production, 1920, $33,477; 1921 lumber cut, 1,300 M. feet; total bank deposits, September 15, 1922, $2,318,274.

TAXATION 1922—Total assessed valuation, $22,083,814; total taxable value, $7,070,105. Total outstanding county bond indebtedness, $285,000; total outstanding county warrant indebtedness, $39,252; total outstanding school bond indebtedness, $80,425. Total general and special county taxes, $108,860; total general and district school taxes, $128,607; total municipal taxes, $51,845; total state taxes, $33,591; total tax, (inclusive municipal), per capita, $46.73.

EDUCATIONAL—Number graded schools, 36; enrollment, 960. Number high schools, 1; enrollment, 222. Other institutions—State Prison, Deer Lodge.

BUSINESS STATISTICS—Number of railroads, 2; railway mileage, exclusive of spurs and sidetracks, 97.58. Number of manufactures, 15; average number wage earners, 440; value of products, $1,180,626. Number of banks, 4. Number general stores, 14; confectionery, etc., 11; groceries and meats, 11; lumber yards, 3; total number merchants, 120. Total assessed valuation 1922 merchandise, $701,484. Number of grain elevators, 3; total capacity, 120,000 bushels. Number of saw mills, 8. Number of lawyers, 8. Number of physicians, 4.

AGRICULTURE (1920 census)—Number farms, 476; farm acreage, 520,065; improved farm acreage, 125,924; irrigated acreage, 64,045; average value all property, per farm, $34,904. Livestock assessed 1922—number cattle, 15,366; number sheep, 94,277; number horses, 4,479; number swine (census), 1,951.

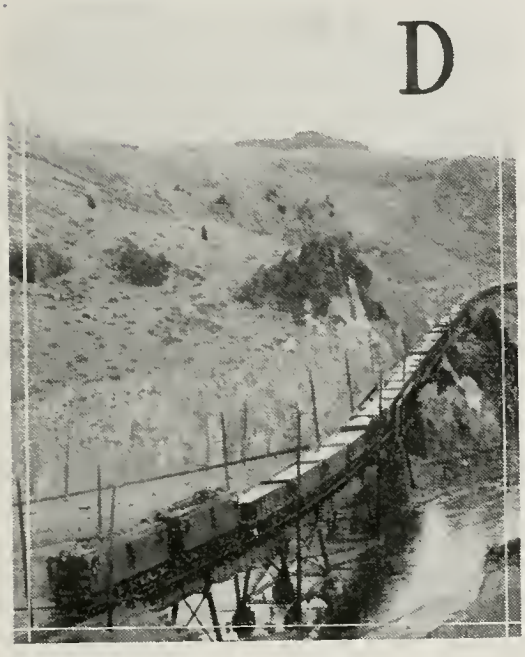
CLIMATOLOGICAL DATA—At Deer Lodge.. Elevation, 4,509 feet. Average date last killing frost in spring, June 11; average date first killing frost in fall, September 6.

	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Ave. Prec.	.70	.48	.92	.82	1.65	2.22	.90	.81	1.26	.74	.67	.62	11.79
Aver. Temp.	21.6	24.0	30.1	40.6	51.3	61.1	67.7	64.1	55.4	44.0	33.1	21.0	42.8

County Seat, Deer Lodge. Population County Seat, 3,780.

County Agricultural Agent—No.

DEER LODGE COUNTY



DEER LODGE, in southwestern Montana, its northern half on the Pacific coast slope and its southern half on the Atlantic side of the continental divide, is primarily an industrial county. At Anaconda, the county seat, is the largest and most modern ore reducing plant in the world. One-fourth of all copper ore produced in the United States is treated here. When operating at capacity it employs 4,000 men. Plants for the utilization of smelter by-products have been erected, including one for making sulphuric acid, another for making arsenic, and another that manufactures super-phosphate fertilizer. There is some farming and truck gardening in the Deer Lodge valley, on the Pacific coast slope. Stock raising is the principal industry on the eastern side of the mountains, winter forage being put up in the valley along the Big Hole River, while good summer range is found in the national forests that occupy more than half the total area of the county.

Biggest Copper Smelter in World

While the Deer Lodge valley was one of the first places in Montana to be settled, and Deer Lodge county one of the original nine counties when the territory of Montana was created, the present county did not assume importance until Marcus Daly decided to build a smelter for the treatment of Butte ores. For this purpose, he founded in 1883 the town of Anaconda, and built a railroad, since electrified, to connect it with Butte, 28 miles distant. From a plant treating 500 tons of ore daily, the works have been enlarged until now they have a capacity of 12,000 tons of ore every 24 hours and a monthly payroll of $300,000.

Besides having the largest copper smelter in the world, Anaconda is the largest producer of unrefined arsenic in the United States and ranks second in refined white arsenic. The sulphuric acid plant has a capacity of 70,000 tons a year. The acid is used in making super-phosphate fertilizer. The capacity of the present phosphate plant is 10,000 tons a year, but work of enlarging it to a capacity of 30,000 tons is under way. The phosphate rock is shipped from mines at Conda, Idaho.

A fire brick plant is operated in connection with the smelter, being built to make refractory brick that would take the place of a product that was imported

from Wales. So satisfactory has the substitute proven that it has captured the market in the western copper-producing states. A large foundry, boiler and machine shop plant is also operated which does custom work as well as work for the smelter and the mines.

A large research department is conducted at Anaconda by the Anaconda Copper Mining Company, which, besides developing new processes for the treatment of ore, also develops processes for the utilization of by-products.

Expect More Manufacturing

An electrolytic process for the treatment of zinc ores was developed by the department which has resulted in Montana taking third rank among the states in the production of this metal. A new method for coloring copper shingles was perfected here. The more complete utilization of smelter by-products and the production of a variety of manufactured articles in Montana is said to be only a question of time.

While most of the ore treated in the Anaconda plant comes from Butte, there are a number of mining districts in the northern part of the county. The county has produced commercially gold, silver, copper, lead and zinc. It also has coal and limestone. Sapphires have been found along Dry Cottonwood Creek.

The main lines of the Northern Pacific and of the Chicago, Milwaukee & St. Paul follow the Deer Lodge River west, and two east and west highways traverse the county. Between Butte and Anaconda is the only hard-surfaced highway in the state.

Anaconda, modern and up to date in all respects, is the only city in the county. Beautiful scenery is found in the mountains, and attractive Alpine lakes. The smokestack at the smelter is the highest in the world—585 feet. A large state fish hatchery is maintained at Anaconda from which many streams are stocked annually.

DEER LODGE COUNTY—Ranks ninth in population (15,323); fifty-second in area (476,800 acres); fifty-first in combined 1922 crop and livestock value; thirteenth in 1920 mineral production; twelfth in bank deposits, 1922; eleventh in assessed valuation, 1922. Acres public land, 7,052; acres state land, 8,718; acres national forests, 239,352.

WEALTH PRODUCTION—Estimated 1922 crop value, $302,500; estimated livestock value, January, 1923, $455,000; metal production, 1920, $146,599; total bank deposits, September 15, 1922, $3,820,709.

TAXATION 1922—Total assessed valuation, $32,590,627; total taxable value, $10,078,615. Total outstanding county bond indebtedness, $143,000; total outstanding county warrant indebtedness, $22,306; total outstanding school bond indebtedness, $32,600; other school debts, $300. Total general and special county taxes, $154,267; total general and district school taxes, $174,716; total municipal taxes, $91,647; total state taxes, $46,464; total tax (inclusive municipal), per capita, $30.48.

EDUCATIONAL—Number graded schools, 18; enrollment, 1,536. Number high schools, 1; enrollment, 526. Other institutions, State Hospital for Insane at Warm Springs; State Tuberculosis Sanitarium at Galen.

BUSINESS STATISTICS—Number of railroads, 3; railway mileage, exclusive spurs and sidetracks, 84.06. *Number of manufactures (Anaconda only), 22; average number wage earners, 272; value of products, $1,340,695. Number of banks, 2. Number general stores, 4; confectionery, etc., 30; groceries and meats, 49; lumber yards, 3; total number merchants, 217. Total assessed valuation 1922 merchandise, $1,154,235. Number creameries, 1. Number of lawyers, 12. Number of physicians, 17.

AGRICULTURE (1920 census)—Number farms, 202; farm acreage, 58,484; improved farm acreage, 24,210; irrigated acreage, 13,474; average value all property, per farm, $12,405. Livestock assessed 1922—number cattle, 3,877; number sheep, 6,206; number horses, 1,415; number swine (census), 1,410.

CLIMATOLOGICAL DATA—At Anaconda. Elevation, 5,288 feet. Average date last killing frost in spring, June 10; average date first killing frost in fall, September 11.

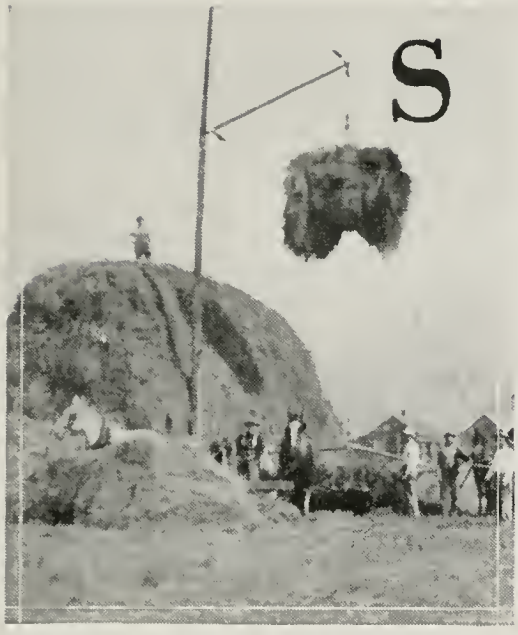
	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Ave. Prec.	.90	.70	.87	.92	2.22	2.22	1.33	.95	1.28	.91	.80	.75	13.85
Ave. Temp.	23.5	25.5	31.9	40.8	47.8	55.5	63.2	61.9	52.8	44.7	33.7	25.3	42.2

County Seat, Anaconda. Population County Seat, 11,668.

County Agricultural Agent—No.

*Statistics on the number of manufactures, average number wage earners and the value of products are not available, the 1920 census grouping Lewis and Clark, Deer Lodge and Treasure counties together so as not to disclose the operations of individual establishments. The combined figures for the three counties are: Number of establishments, 83; average number wage earners, 3,445; value of products, $44,560,516. By far the larger number of wage earners, and much of the value of the product can be credited to the operations of the Anaconda Copper Mining Company at Anaconda.

GRANITE COUNTY



SMALL in area and population, Granite county, in west central Montana, on the west side of the main range of the Rocky Mountains, is unusually well diversified in industrial as well as agricultural resources. Millions of dollars have been extracted from its silver mines. It is the only important producer of manganese at the present time, the output of its mines being greater than the combined output of all other mines in the country. The sapphire mines on Rock Creek are reputed to be the largest in the world, though not the finest. The gems are mined on a big scale and shipped east by the ton to be used in watches and other precision instruments. It has enormous deposits of high grade phosphate which the U. S. Geological Survey predicts will be commercially developed. It also has lignite coal, large forests, numerous mountain streams, beautiful scenery and unexcelled hunting and fishing. Mixed farming is the prevailing type in both the irrigated valleys and on the non-irrigated table lands. While the proportion of tillable land to the total area of the county is small, the untillable areas afford fine grazing.

It is a county of balanced industry, its annual crop, livestock and metal production being of about equal value, although it has more undeveloped mineral than other resources. The agricultural areas of the county are in the Flint and Rock Creek valleys, the Hell Gate River valley and on the table lands back of them. The valleys are narrow and protected by high mountains. The soil is alluvial, fertile and deep. Good water is abundant from the many mountain streams and springs. Both irrigated and non-irrigated farming are followed and generally good yields are obtained of small grains and forage crops. The national forests and a considerable acreage of public domain provide fine summer grazing areas and the livestock industry is as important as crop production. The county is well situated as regards the larger Montana markets. Natural conditions are well adapted to dairying and the industry is growing.

Balanced Industry

Granite county for many years has been one of the most important mining regions of the state in continuity of operation and gross production. It has been a commercial producer of gold, silver, copper, lead, zinc, sapphires, manganese, and lignite coal for home use. Its phosphate reserves have not been developed. It is also reported to have platinum, corundum and deposits of brick clay. The mining payroll runs about $75,000 a month. There is also some lumbering in the county.

The main lines of the Northern Pacific and of the Chicago, Milwaukee & St. Paul cross the county near the northern border, and a Northern Pacific branch runs south up Flint Creek in the center of the county to Philipsburg. The Yellowstone Trail parallels the railroads. There is a direct highway into Anaconda from Drummond via Philipsburg, and a state highway has recently been completed across the mountains into the Bitter Root valley near Hamilton, which will give an alternative main east and west route through the western part of the state.

New East and West Highway

Philipsburg, the county seat, lies upon the upper terrace of the Flint Creek valley, at the base of the continental divide. It is the largest and most important town, with water system, electric lights and other modern conveniences. Many of the most important mines in the county lie near it. Hall, in the northern part, lies in one of the most fertile agricultural districts of the county. Drummond, the junction point with the main line of the Northern Pacific branch to Philipsburg, is the trading center for the northern end of the county.

The county possesses many and varied tourist attractions.

GRANITE COUNTY—Ranks forty-fifth in population (4,167); thirty-eighth in area (1,098,880 acres); forty-fifth in combined 1922 crop and livestock value; eighth in 1920 mineral production; thirty-fifth in bank deposits, 1922; forty-seventh in assessed valuation, 1922. Acres public land, 100,450; acres state land, 17,882; acres national forests, 664,835.

WEALTH PRODUCTION—Estimated 1922 crop value, $792,200; estimated livestock value, January, 1923, $873,700; metal production, 1920, $787,015; 1921 lumber cut, 75 M feet; total bank deposits, September 15, 1922, $958,027.

TAXATION 1922—Total assessed valuation, $11,307,220; total taxable value, $3,940,963. Total outstanding county bond indebtedness, $275,000; total outstanding county warrant indebtedness, $30,172; total outstanding school bond indebtedness, $9,000. Total general and special county taxes, $111,252; total general and district school taxes, $74,283; total municipal taxes, $9,151; total state taxes, $18,727; total tax (inclusive municipal), per capita, $51.21.

EDUCATIONAL—Number graded schools, 23; enrollment, 680. Number high schools, 2; enrollment, 135.

BUSINESS STATISTICS—Number of railroads, 2; railway mileage, exclusive spurs and sidetracks, 83.55. Number of manufactures, 9; average number wage earners, 17; value of products, $131,981. Number of banks, 4. Number general stores, 7; confectionery, etc., 2; groceries and meats, 9; lumber yards, 5; total number merchants, 85. Total assessed valuation 1922 merchandise, $212,233. Number grain elevators, 2; total capacity, 45,000 bushels. Number saw mills, 6. Number of lawyers, 6. Number of physicians, 3. Developed hydro-electric plant capacity, 2,340 horse power.

AGRICULTURE (1920 census)—Number farms, 354; farm acreage, 254,148; improved farm acreage, 72,336; irrigated acreage, 31,177; average value all property, per farm, $26,182. Livestock assessed 1922—number cattle, 11,679; number sheep, 10,754; number horses, 3,496; number swine (census), 878.

CLIMATOLOGICAL DATA.—At Philipsburg. Elevation, 5,273 feet. Average date last killing frost in spring, June 14; average date first killing frost in fall, August 29.

	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Ave. Prec.	.71	.69	.97	1.27	2.38	2.84	1.40	.93	1.56	1.17	.96	.58	15.46
Ave. Temp.	22.2	24.5	31.6	41.1	47.1	55.4	62.2	60.7	52.5	43.0	32.1	24.4	41.4

County Seat, Philipsburg. Population County Seat, 1,724.
County Agricultural Agent—No.

MISSOULA COUNTY

INDUSTRIALLY, Missoula ranks fourth, and in population, fifth in the list of Montana counties. In lumber production it ranks first. While its agricultural area, since the creation of Lake county, is small, the strategic location of its leading city, Missoula, makes it the principal shipping and distributing point for all that portion of Montana lying west of the main range of the Rockies and south of Flathead Lake which includes two of the state's best valleys, the Bitter Root and the Lower Flathead. The location of the State University at Missoula has made the city one of the chief educational centers of Montana.

Unlike many of the older settled districts of Montana the development of the Missoula region did not originate in a mining boom. During the first half of the nineteenth century trappers and voyageurs hunted through the region, and the

Hell Gate canyon, near the city of Missoula, was the easiest pass through which the Flathead, Nez Perce and other tribes could go to the hunting grounds for buffalo on the eastern slopes of the mountains. The canyon was given its name by trappers interpreting the Indian word for a place of fear, as it was here that the Blackfeet ambushed the western tribes. In 1860 a trading post was started five miles below the city of Missoula and the same year the county of Missoula was created by the territory of Washington. In 1865 the trading post was removed to the present site of Missoula. A grist mill and a saw mill were also built, the former to grind the grain of the pioneer farmers who had settled in the district. Placer gold discoveries on the Kootenai in 1864 and on Cedar Creek (now in Mineral county) in 1869 brought in people, many of whom turned to agriculture. First surveyed in 1853, the line of the Northern Pacific was finally opened in 1883 and lumbering began to develop, steadily growing in importance with the expansion of mining and agriculture in other parts of Montana.

Missoula county lies in west central Montana. The Idaho-Montana boundary defines the border of the southwestern corner. Lake county acquired the northwestern quarter leaving, Missoula an inverted ⌊ in shape, with a maximum length east and west of 60 miles and a maximum breadth north and south of 66 miles. The northeastern stem of the county extends from the crest of the Mission range on the west to the Flathead range on the east and takes in the headwaters of Swan River, flowing north, and of the Clearwater River, flowing south. This part of the county lies wholly within national forests.

Big Industry Is Lumbering

The Missoula and Grass valleys near Missoula, containing 70,000 acres, the lower Bitter Root, of which 20,000 acres are in the county, and the lower Blackfoot of which about 20,000 acres are also in the county, are the principal farming areas. Soil types range from sandy and clay loam in the valleys and on the lower benches to coarse gravel at the higher elevations. In the Big Blackfoot valley the principal crops are grain and hay. Considerable stock is also raised. In the other agricultural districts small grains, alfalfa, apples and bush fruits, potatoes and garden truck are the principal crops. Dairying and hog raising are well established. Sugar beets, grown experimentally, have done well. Irrigated farming is the dominant type.

Missoula has the largest saw mill capacity of any county. Much timber from other counties is made into lumber in them. At Bonner, seven miles east of Missoula, is a plant with an annual capacity of about 100,000,000 board feet; at Milltown, close to Bonner, is another plant with a capacity of 40,000,000; at Missoula another plant with a capacity of 20,000,000 feet, and there are smaller plants in the county with a capacity of about 5,000,000 feet. While there has never been any large scale mining in the county it has commercially produced gold, silver, copper, lead and some coal. It also has barite, brick clay, pottery clay and a variety of building stones.

Other industries besides lumbering include car shops and roundhouses of the Northern Pacific Railway, several large wood-working plants, metal working plants, brick, tile and concrete products, flour and cereal mills, creameries, and a number of other manufacturing plants. In 1923 the Missoula Chamber of Commerce started work on an industrial survey to ascertain what industries are best adapted to the natural resources of the region and to the markets available.

The main lines of the Northern Pacific and of the Chicago, Milwaukee & St. Paul traverse the southern half of the county. Branch line trains of the Northern Pacific, out of Missoula, run south through the Bitter Root valley, northwest through the Mission valley to Polson, on Flathead Lake, and west to Coeur d'Alene mining camps of Idaho. The Milwaukee has built a branch a short dis-

tance up the Blatfoot River whose original projected destination was Great Falls. An interurban line connects Missoula and Bonner. The main east and west highways parallel the transcontinental railways and the western Park to Park route from West Yellowstone to Belton, the western entrance to the Glacier Park crosses the county north and south.

The State University

Missoula is the largest city in Montana on the western side of the main range of the Rockies, and is also one of the largest in the state. It is thoroughly modern, well built, and besides being an important industrial and distributing center, is considered one of the most attractive residential cities of the state. The State University is steadily growing in size and influence. Among other distinctions, it is the first higher educational institution in the United States to give academic recognition to the profession of public relations. The headquarters of the United States Forest District No. 1, embracing several states, are at Missoula.

At Fort Missoula, known as the "Million Dollar Post" because of the excellence of its construction, is now located a battalion of the Fourth infantry, U. S. army. The monthly payroll is about $19,000. This is the only army post in Montana today.

Beautiful drives, well-stocked fishing streams, hunting, and a wide variety of scenery are among the tourist attractions. A tourist resort is maintained at Lolo Hot Springs, in the southwestern corner of the county, on the route of the Lewis and Clark expedition.

MISSOULA COUNTY—*Ranks fifth in population (18,935); twenty-fourth in area (1,702,631 acres); thirty-ninth in combined 1922 crop and livestock value; thirty-second in 1920 mineral production; fifth in bank deposits, 1922; sixth in assessed valuation, 1922. Acres public land, 44,185; acres state land, 75,234; acres national forests, 567,525; acres Indian (most of it allotted) and other reservations, 208,940.

WEALTH PRODUCTION—Estimated 1922 crop value, $1,114,100; estimated livestock value, January, 1923, $1,083,500; metal production, 1920, $1,830; 1921 lumber cut, 77,065 M feet; total bank deposits, September 15, 1922, $7,240,228.

TAXATION 1922—Total assessed valuation, $57,180,312; total taxable value, $17,748,898. Total outstanding county bond indebtedness, $840,100; total outstanding county warrant indebtedness, $233,456; total outstanding school bond indebtedness, $890,550. Total general and special county taxes, $372,971; total general and district school taxes, $481,950; total municipal taxes, $160,562; total state taxes, $82,071; total tax (inclusive municipal), per capita, $45.65.

EDUCATIONAL—Number graded schools, 64; enrollment, 3,700. Number high schools, 10; enrollment, 848. Other institutions, State University, Missoula, 1,855 students, 100 instructors.

BUSINESS STATISTICS—Number of railroads, 2; railway mileage, exclusive spurs and sidetracks, 229.08. Number of manufactures, 61; average number wage earners, 1,888; value of products, $6,857,815. Number of banks, 9. Number general stores, 31; confectionery, etc., 28; groceries and meats, 69; lumber yards, 18; total number merchants, 459. Total assessed valuation 1922 merchandise, $5,119,007. Number grain elevators, 12; total capacity, 555,000 bushels. Number creameries, 2. Number flour mills, 2. Number saw mills, 14. Number of lawyers, 66. Number of physicians, 35. Developed hydro-electric plant capacity, 3,200 horse power.

AGRICULTURE (1920 census)—Number farms, 1,323; farm acreage, 388,408; improved farm acreage, 173,031; irrigated acreage, 50,237; average value all property, per farm, $13,383. Livestock assessed 1922—number cattle, 11,671; number sheep, 3,532; number horses, 5,452; number swine (census), 5,535.

CLIMATOLOGICAL DATA—At Missoula. Elevation, 3,225 feet. Average date last killing frost in spring, May 23; average date first killing frost in fall, September 18.

	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Ave. Prec.	1.35	.86	1.02	1.03	2.12	2.15	1.02	.86	1.34	1.20	1.18	1.43	15.56
Ave. Temp.	22.2	26.0	35.2	44.9	52.3	59.4	66.8	65.2	55.4	44.6	33.3	24.9	44.2

County Seat, Missoula. Population County Seat, 12,668.

County Agricultural Agent—No.

*All the statistical information on Missoula County, except those for population and rank, area and rank and acres of reservations other than national forests are based on the boundaries of Missoula County before Lake County was created which took from Missoula County 362 square miles and from Flathead County 1,224 square miles.

RAVALLI COUNTY

THE cradle of agriculture in Montana when Father DeSmet, in 1845, at St. Mary's Mission, near the present town of Stevensville, first broke the sod and first planted grain and vegetables, Ravalli county continues to hold a place among the leaders in farm and livestock progress. For many years it was one of the most important lumber-producing counties in the state and operations are still conducted on a considerable scale.

Ravalli county lies in west central Montana, on the Pacific slope side of the Rockies. On three sides it is completely walled in by mountains. The crest of the Bitter Root mountains, which is also the Idaho-Montana boundary, defines its western and half of its southern border, the continental divide marking the east half of its southern boundary. It extends east to the crest of the Sapphire range of mountains. Averaging 30 miles in width east and west, the county is approximately 75 miles long, through the center of which flows the Bitter Root River, the waters of which are augmented by numerous tributaries flowing easterly out of the Bitter Root range and westerly out of the Sapphire Mountains. More than two-thirds of the county is included within national forests.

Much Irrigated Land

The agricultural areas are confined to the Bitter Root valley, and the bench lands back of it. No county in the state probably has a larger proportion of its tillable lands under irrigation than has Ravalli. Practically all the land in the Bitter Root valley and much of it on the lower bench lands is irrigated. On the higher benches between the irrigated lands and the mountains, non-irrigated farming is followed with small grains as the chief crops. Diversified farming is well established, climatic, soil and other conditions making the region well adapted to fruit raising, truck gardening, dairying, swine and poultry raising, agriculture, potatoes, alfalfa and small grains. The growing of peas for both seed and canning has become an important enterprise. In potato production the county ranks second. The McIntosh apple, the sour cherry, bush fruits and berries are the chief horticultural products. A canning factory at Hamilton has provided a market for string beans, cherries and strawberries, and another factory at Stevensville a market for peas and cherries.

Dairying is probably further advanced in the Bitter Root valley than in any other part of the state. There are good herds of Guernsey, Holstein and Jersey cattle. The first cow-testing association in the state was launched here, and at Stevensville, in the north end, the first co-operative creamery, which is one of the largest and most successful of a co-operative nature in the northwest. There is another creamery at Hamilton, in the south end of the county. Cheese manufacture is expanding with factories at Corvallis, two at Stevensville, and a fourth one at Victor for the production of Swiss cheese.

There are some good beef herds in Ravalli county and some cattle and sheep are grazed by local owners on the adjacent national forests, but an opportunity exists for range livestock growing to be expanded. For several years many

thousand head of sheep from Washington have been shipped in to utilize the range on the national forests which otherwise would not have been grazed. Swine raising, in connection with dairying, is growing and a number of pure-bred herds have been established. So also is poultry raising, both for eggs and day-old chicks, with White Leghorns as the most popular variety.

Lumbering operations are on a much reduced scale compared with those of two decades ago, but the industry is still important. While there have never been any large mining operations, the county has produced commercially gold, silver, copper, lead, zinc and coal. The existence of aluminum clays is reported. Beds of brick and pottery clay are also found.

So far as the immediate future is concerned, the industrial development of the county is apt to be along agricultural lines. Hamilton and Stevensville have openings at present (1923), it is said, for plants making horticultural by-products such as cider, vinegar and apple butter.

By-Products Plants Openings

Excellent transportation facilities are afforded the agricultural districts of the county by a branch line of the Northern Pacific out of Missoula, which runs south through the heart of the Bitter Root valley to Darby. The western route Park to Park highway, from West Yellowstone to Belton, traverses the county north and south. A new state highway was completed in the fall of 1923, over the Skalkaho pass in the Sapphire mountains, that directly connects Hamilton with Butte and Anaconda, via Philipsburg.

Hamilton, situated about midway north and south of the county, is the county seat and the largest town, with all modern conveniences. It is the principal shipping and distributing point for a large area. Stevensville, in the north end of the valley, is the second largest town, and in the heart of the dairying district. Florence, Corvallis, Victor, Grantsdale and Darby are shipping points.

Beautiful scenery, fine hunting and good fishing are among the tourist attractions. The region is of much historic interest. Lewis and Clark followed the Bitter Root River through the county on their journey westward in 1805; the Bitter Root valley was the tribal home of the Flathead Indians until their removal by treaty 30 years ago; the first church in Montana was built here; and the Nez Perce Indians in their outbreak of 1877 swept through the valley. Through the loyalty of Chief Charlo of the Flatheads they left the settlers unmolested. The Marcus Daly racing stud which swept the American turf was established near Hamilton.

RAVALLI COUNTY—Ranks seventeenth in population (10,098); twenty-eighth in area (1,530,240 acres); fifteenth in combined 1922 crop and livestock value; thirty-fifth in 1920 mineral production; twenty-first in bank deposits, 1922; twenty-fifth in assessed valuation, 1922. Acres public land, 5,280; acres state land, 26,737; acres national forests, 1,035,315.

WEALTH PRODUCTION—Estimated 1922 crop value, $2,022,100; estimated livestock value, January, 1923, $1,856,000; metal production, 1920, $130; 1921 lumber cut, 16,459 M. feet; total bank deposits, September 15, 1922, $1,777,839.

TAXATION 1922—Total assessed valuation, $21,732,311; total taxable value, $6,658,861. Total outstanding county bond indebtedness, $531,000; total outstanding county warrant indebtedness, $75,808; total outstanding school bond indebtedness, $230,620; other school debts, $32,232. Total general and special county taxes, $235,341; total general and district school taxes, $184,249; total municipal taxes, $22,654; total state taxes, $32,288; total tax (inclusive municipal), per capita, $46.99.

EDUCATIONAL—Number graded schools, 27; enrollment, 2,177. Number high schools, 6; enrollment, 529.

BUSINESS STATISTICS—Number of railroads, 1; railway mileage, exclusive spurs, and sidetracks, 46.71. Number manufactures, 25; average number wage earners, 124; value of products, $699,916. Number of banks, 8. Number general stores, 17; confectionery, etc., 4; groceries and meats, 21; lumber yards, 6; total number merchants, 191. Total assessed valuation 1922 merchandise, $772,798. Number grain elevators, 4; total capacity, 130,000 bushels. Number creameries, 2. Number flour mills, 2. Number saw mills, 13. Number of lawyers, 11. Number of physicians, 13.

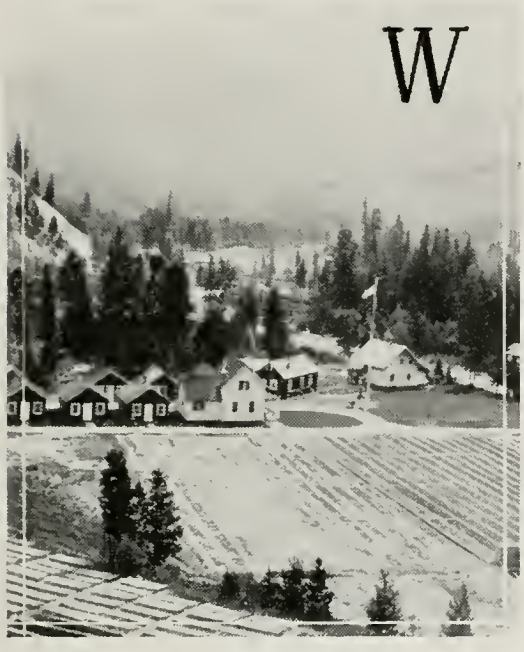
AGRICULTURE (1920 census)—Number farms, 1,231; farm acreage, 245,965; improved farm acreage, 114,473; irrigated acreage, 107,028; average value all property, per farm, $15,451. Livestock assessed 1922—number cattle, 20,044; number sheep, 22,817; number horses, 5,898; number swine (census), 10,386.

CLIMATOLOGICAL DATA—At Hamilton. Elevation, 3,583 feet. Average date last killing frost in spring, May 17; average date first killing frost in fall, September 23.

	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Aver. Prec.	.87	.67	.72	.97	1.68	1.66	.68	.64	1.11	.93	.87	.49	11.29
Ave. Temp.	27.9	29.2	38.2	46.9	53.3	60.6	66.7	65.2	56.6	46.8	36.5	26.5	46.2

County Seat, Hamilton. Population County Seat, 1,700.
County Agricultural Agent—Yes.

MINERAL COUNTY



WHILE Mineral county has the fewest farms and the smallest farm acreage of any Montana county, within its borders is the largest nursery for growing forest trees in the United States. The annual capacity of the nursery is three million seedlings. There are areas of cut-over land, which, when cleared, wlil be adapted to agricultural purposes. Three-fourths of the county is included within national forests which provide excellent summer grazing for sheep. Until the past year or two this was not utilized, but since then sheepmen from the state of Washington have obtained permits. In 1923 about 60,000 head of western sheep were grazed here.

The county lies in west central Montana, the crests of the Bitter Root range on the Idaho-Montana boundary marking its southern and western borders, while the crest of the Coeur d'Alene mountains defines the western half of its northern border. It is about 60 miles in length from the southeast to the northwest, with a maximum width of about 30 miles. The Clark's Fork of the Columbia runs lengthwise through the middle of the western half of the county, and at St. Regis, where it swings north, receives the waters of the St. Regis River, whose course is easterly from the Idaho line through the center of the western part. The river affords opportunity for power development at several sites. It is estimated about 14,000 acres of land are susceptible of irrigation.

The agricultural lands consist of narrow strips, in many places of bench lands 200 feet above the river. Livestock growing is more important than farming. The principal crops are clover and timothy, grain, vegetables and small fruits and berries.

Logging and Milling

The timber resources of Mineral county are of considerable importance. A modern two-band saw mill is operated at Henderson by the Mann Lumber Company, and there are several portable mills which operate in the county, largely from National Forest timber. Active logging operations are maintained by the Anaconda Copper Mining Company, the logs being shipped to the Bonner mill. The national forest timber in Mineral county is estimated at nearly 1,200,000 M. feet.

Gold, Silver, Copper

Lead and zinc have been produced commercially within the county. Large amounts of placer gold have been taken from streams emptying into the Clark's Fork from the south. There are many indications of copper, but development work has been limited.

The main line of the Chicago, Milwaukee & St. Paul traverses the county east and west, and a main line of the Northern Pacific runs through the eastern half of the county as far west as St.

Regis, where it turns northward. From St. Regis a Northern Pacific branch line runs westward and taps the Coeur d'Alene mining district of Idaho. A main east and west highway parallels the railroads.

Superior is the county seat and the largest town. At Haugan, in the west end near Saltese, is the tree nursery of the Forest Service. St. Regis is a railroad junction point.

Beautiful scenery, splendid fishing and good big game hunting are among some of the tourist attractions of the county. Several hunting lodges are maintained by licensed guides.

MINERAL COUNTY—Ranks fifty-fourth in population (2,327); forty-eighth in area (787,200 acres); fifty-fourth in combined 1922 crop and livestock value; twenty-first in 1920 mineral production; fifty-fourth in bank deposits, 1922; forty-sixth in assessed valuation, 1922. Acres public land, 55,100; acres state land, 26,085; acres national forests, 581,979.

WEALTH PRODUCTION—Estimated 1922 crop value, $64,500; estimated livestock value, January, 1923, $81,100; metal production, 1920, $23,054; 1921 lumber cut, 367 M feet; total bank deposits, September 15, 1922, $126,545.

TAXATION 1922—Total assessed valuation, $11,481,992; total taxable value, $4,266,864. Total outstanding county bond indebtedness, $185,000; total outstanding county warrant indebtedness, $8,798; total outstanding school bond indebtedness, $109,000. Total general and special county taxes, $103,304; total general and district school taxes, $101,088; total state taxes, $19,584; total tax (inclusive municipal), per capita, $96.25.

EDUCATIONAL—Number graded schools, 14; enrollment, 398. Number high schools, 3; enrollment, 100.

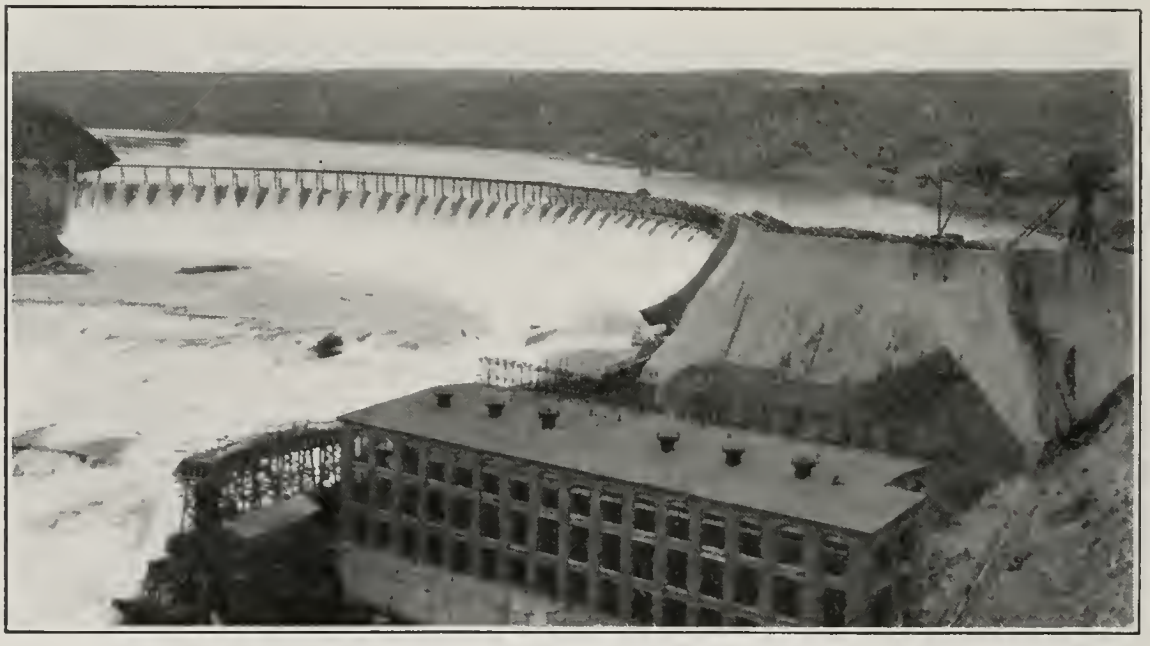
BUSINESS STATISTICS—Number of railroads, 2; railway mileage, exclusive spurs and sidetracks, 168.50. Number of manufactures, 7; average number wage earners, 167; value of products, $332,246. Number of banks, 1. Number general stores, 14; confectionery, etc., 5; groceries and meats, 6; lumber yards, 1; total number merchants, 54. Total assessed valuation 1922 merchandise, $47,805. Number saw mills, 4. Number of lawyers, 1. Number of physicians, 2. Developed hydro-electric plant capacity, 144 horse power.

AGRICULTURE (1920 census)—Number farms, 95; farm acreage, 20,209; improved farm acreage, 5,160; irrigated acreage, 967; average value all property, per farm, $7,559. Livestock assessed 1922—number cattle, 872; number sheep, 69; number horses, 580; number swine (census), 327.

CLIMATOLOGICAL DATA—At Superior. Elevation, 2,975 feet. Average date last killing frost in spring, June 7; average date first killing frost in fall, September 7.

	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Ave. Prec.	1.38	1.15	1.87	1.16	2.34	1.62	1.03	.90	1.60	.92	1.32	2.21	17.50
Ave. Temp.	24.3	28.2	36.4	41.8	49.8	57.8	66.0	65.0	55.0	43.3	32.0	24.7	43.7

County Seat, Superior. Population County Seat, 865.
County Agricultural Agent—No.



Water-Power Electricity Is Abundant

NORTH EASTERN MONTANA

Ranks First in Wheat and Oats—Little Irrigated Land Outside of the Milk River Valley and Fort Peck Reservation—Tendency to Abandon the One-Crop System.

North Eastern Montana is more nearly exclusively agricultural in character than any other district in the state. Daniels, Sheridan and Roosevelt counties, which occupy the eastern part, aside from coal mining, are devoted almost wholly to farming. Most of the land south of the Milk River, in Phillips and Valley counties, which occupy the western part, is devoted to stockraising.

Non-irrigated farming predominates, there being practically no irrigated lands outside of the Milk River valley and the old Fort Peck Indian reservation. Both of these are government projects. Reclamation has proceeded faster than settlement and development in the Milk River valley, the lands of which have been devoted chiefly to native hay and operated in units so large as to preclude diversified farming, though well adapted to it. In the past year or two a movement has developed to reduce the size of the units and bring in farmers.

Production on non-irrigated land in the three eastern counties makes this the banner wheat producing district. It is first in oats. Scobey, in Daniels county, lays claim to being the largest primary wheat market in the world. The one-crop system has prevailed since farming began fifteen years ago, but recently there has been an increase in the corn acreage; dairying is developing, and other evidences exist of a movement toward diversification.

The northwestern part of the district is handicapped by lack of rail facilities.

Elevations, 1,900 to 2,490 feet. The growing season is three and a half to four months.

ROOSEVELT COUNTY

WITH 95 per cent of its area tillable and a tenth irrigable, Roosevelt county, which, with only a sixth of its acreage improved, ranks eighth in crop production, seems destined to be one of the banner agricultural districts of the state when more of its lands are cultivated. Two-thirds of its area is included within the Fort Peck Indian reservation. Some years ago the reservation was opened to homesteading on an appraised land basis, and while many filings were made, much of the homestead land and many tracts belonging to Indians are not being farmed at present.

Roosevelt county lies in northeastern Montana. It is about 85 miles long, east and west, and from 18 to 36 miles wide, north and south. The Dakota-Montana boundary marks its eastern, and the Missouri River its southern borders. Non-irrigated farming will always be the

dominant type, but when the Fort Peck project, the largest irrigation enterprise in the United States of the Indian Service is completed, more than 100,000 acres will be under the ditch. Sandy loam types of soil predominate in the eastern part and in the western and northern districts they range from sandy to clay loams. The lighter soils require careful cultural methods to avoid soil blowing. The results of a preliminary soil survey made by the State College of Agriculture in this county will shortly be available. Lignite coal is found in many districts.

The Leading Crops

Spring wheat, flax and oats are the principal cash crops with rye and corn the leading feed crops. The average elevation of the county is 2,000 feet, the growing season is hot, and corn has proven one of the most dependable crops for the district. It is assuming an important place in the crop rotation plan and bringing livestock back to the region which was a noted range three decades ago. Fort Peck reservation lands which are in native sod are being leased to farmers and stockmen, and several big range stock concerns are operating there.

The southern and eastern districts have adequate transportation facilities, but hauls to the railroad from the northwestern part of the county are long. The main line of the Great Northern follows the Missouri River valley near the southern border. A branch line runs from Bainville, in the southeastern corner, runs northwesterly across the county into Sheridan and Daniels counties. The Theodore Roosevelt highway parallels the main line of the Great Northern.

Wolf Point, in the west end of the county, is a division point on the Great Northern, the shipping and trade center for a good agricultural district lying to the north, and the largest town. Poplar, midway across the county, is the county seat and the headquarters of the Indian service. Annually an Indian fair is held here. Culbertson, in the eastern end of the county, is one of the oldest towns in northeastern Montana, and the principal marketing point for the best developed agricultural and stock raising district. Some good herds of registered Shorthorns are found in this district, and a stock show is usually held once a year at Culbertson. Bainville, a railroad junction point, and McCabe and Froid are shipping points on the Bainville-Scobey branch.

Some of the first fur trading posts and Indian forts built in Montana were established in what is now Roosevelt county along the Missouri river.

ROOSEVELT COUNTY—Ranks sixteenth in population (10,347); thirtieth in area (1,505,920 acres); eighteenth in combined 1922 crop and livestock value; twenty-seventh in 1920 mineral production; sixteenth in bank deposits, 1922; thirty-fourth in assessed valuation, 1922. Acres public land, 2,606; acres state land, 19,359; acres Indian reservations (most of it allotted), 1,015,373.

WEALTH PRODUCTION—Estimated 1922 crop value, $2,575,000; estimated livestock value, January, 1923, $1,240,900; coal production, 1920, $9,000; total bank deposits, September 15, 1922, $2,165,486.

TAXATION 1922—Total assessed valuation, $18,240,711; total taxable value, $6,086,632. Total outstanding county bond indebtedness, $754,000; total outstanding county warrant indebtedness, $171,072; total outstanding school bond indebtedness, $347,010; other school debts, $35,041. Total general and special county taxes, $174,183; total general and district school taxes, $201,709; total municipal taxes, $82,908; total state taxes, $28,791; total tax (inclusive municipal), per capita, $47.12.

EDUCATIONAL—Number graded schools, 58; enrollment, 2,068. Number high schools, 6; enrollment, 398.

BUSINESS STATISTICS—Number of railroads, 1; railway mileage, exclusive spurs and sidetracks, 118.46. Number of manufactures, 21; average number wage earners, 39; value of products, $940,849. Number of banks, 12. Number general stores, 25; confectionery, etc., 5; groceries and meats, 14; lumber yards, 9; total number merchants, 216. Total assessed valuation 1922 merchandise, $636,760. Number grain elevators, 21; total capacity, 554,000 bushels. Number creameries, 1. Number flour mills, 1. Number of lawyers, 13. Number of physicians, 8.

AGRICULTURE (1920 Census)—Number of farms, 1,215; farm acreage, 673,936; improved farm acreage, 302,519; irrigated acreage, 1,190; average value all property, per farm, $14,297. Livestock assessed 1922—number cattle, 13,331; number sheep, 626; number horses, 9,887; number swine (census) 2,595.

CLIMATOLOGICAL DATA—At Poplar. Elevation, 2,020 feet. Average date last killing frost in spring, May 15; average date first killing frost in fall, September 16.

	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Ave. Prec.	.59	.45	.81	.90	1.84	3.02	1.73	1.14	.94	.70	.65	.43	13.20
Aver. Temp.	6.1	8.6	23 8	43.8	54.9	62.7	70.6	67.9	57.2	44.7	27.7	14.7	40.2

County Seat, Poplar. Population County Seat, 1,152.

County Agricultural Agent—Yes.

SHERIDAN COUNTY

WITH only about half of its tillable area improved, Sheridan was the leading county in the eastern half of Montana in crop production in 1922, and ranked second in the whole state. It is one of the older non-irrigated districts of the state and consequently there has been greater development of permanently improved farms and of a stabilized type of agriculture than in some of the other districts. Aside from coal production, it is exclusively agricultural and stock raising in character.

It lies in northeastern Montana. From the Canadian border on the north it extends southward about 42 miles and from the Dakota boundary on the east westward about 45 miles. The Big Muddy, which rises in Canada and runs southeasterly, is the only stream of any size. About a third of the county is classified as sharply rolling or as bad lands. Much information concerning Sheridan county is found in Bulletin No. 158, Montana Experiment Station, Bozeman. The soil has been classified into five types, the most important of which is the Williams loam, with a surface soil of 7 to 10 inches of friable to mealy dark chocolate brown to brown loam, and a gray to grayish brown calcareous loam subsoil. This soil covers 68 per cent of the county.

Farm Survey of Region

For 25 to 30 years prior to 1906 stock raising was the leading industry. The homesteading era in this region began in 1908 and reached its climax between 1910 and 1916. Spring wheat and flax are the principal cash crops with oats, barley and corn as feed crops. A detailed report on farming in Sheridan county is given in "Farming in Northeastern Montana," issued January, 1923, by the Bureau of Agricultural Economics, U. S. Department of Agriculture. The average size farm in Sheridan county was 492 acres, according to the report, of which 230 acres were in crop and 30 acres in fallow. Farming operations alone resulted in the betterment of the financial condition of 64 per cent of the Sheridan farmers included in the survey, while farming activities and increased land values, combined, resulted in the betterment of the financial condition of 92 per cent of them. The one-crop system predominated. Livestock products amounted to an average of only $106 per farm, which the report says, "seems low for a region which at one time was wholly devoted to grazing." With the expansion of the corn acreage, more attention is being given livestock.

There are no large coal mines in Sheridan, but considerable lignite is mined for home markets, principally during the winter months. Near Redstone the U. S. Geological Survey reports the existence of an extensive bed of clay, which is suitable for brick making and, aside from its color, for pottery. The proximity of lignite coal plus nearness of the railroad are factors that give the clay beds potential commercial importance.

A branch of the Great Northern Railway out of Bainville runs north to Plentywood, near the geographical center of the county, and then swings westward into Daniels county. A branch line of the Soo road enters the county from Dakota, near the northern border, and runs westerly to a terminus in Daniels county.

Plentywood, the county seat, is the largest town. Medicine Lake, Antelope and Redstone are smaller communities on the Great Northern. Westby, near the eastern border, and Outlook, in the northwestern part, are the chief towns on the Soo line.

The region is of geological interest, geologists holding to the opinion that before the ice invasion the Missouri River flowed northward into Hudson Bay, its former channel marked by a broad depression from Medicine Lake northeast to Westby.

SHERIDAN COUNTY—Ranks eighteenth in population (9,376); thirty-seventh in area (1,125,120 acres); fifth in combined 1922 crop and livestock value; fifth in 1920 mineral production; eighteenth in bank deposits, 1922; thirty-second in assessed valuation, 1922. Acres public land, 1,666; acres state land, 40,408; acres Indian reservations (most of it allotted), 115,200.

WEALTH PRODUCTION—Estimated 1922 crop value, $4,004,500; estimated livestock value, January, 1923, $1,635,500; coal production, 1920, $1,551,000; total bank deposits, September 15, 1922, $2,024,804.

TAXATION 1922—Total assessed valuation, $19,574,763; total taxable value, $6,077,473. Total outstanding county bond indebtedness, $810,000; total outstanding county warrant indebtedness, $426,508; total outstanding school bond indebtedness, $228,641; other school debts, $39,722. Total general and special county taxes, $213,167; total general and district school taxes, $248,133; total municipal taxes, $18,196; total state taxes, $29,162; total tax (inclusive municipal), per capita, $54.25.

EDUCATIONAL—Number graded schools, 87; enrollment, 2,174. Number high schools, 7; enrollment, 207.

BUSINESS STATISTICS—Number of railroads, 2; railway mileage, exclusive spurs and sidetracks, 104.96. Number of manufactures, 30*; average number wage earners, 182*; value of products, $542,809*. Number of banks, 16. Number general stores, 23; confectionery, etc., 6; groceries and meats, 13; lumber yards, 15; total number merchants, 213. Total Assessed valuation 1922 merchandise, $545,116. Number grain elevators, 37; total capacity, 921,000 bushels. Number creameries, 1. Number flour mills, 3. Number of lawyers, 17. Number of physicians, 7.

AGRICULTURE (1920 census)**—Number farms, 2,408; farm acreage, 1,155,859; improved farm acreage, 570,955; irrigated acreage, 3,879; average value all property, per farm, $12,826. Livestock assessed 1922—number cattle, 16,738; number sheep, 5,049; number horses, 13,782; number swine (census), 4,360.

CLIMATOLOGICAL DATA—At Medicine Lake. Elevation, 1,969 feet. Average date last killing frost in spring, May 23; average date first killing frost in fall, September 15.

	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Ave. Prec.	.47	.44	.49	1.16	1.72	2.92	2.11	1.53	1.54	.88	.29	.30	13.85
Ave. Temp.	5.6	7.7	19.9	41.6	52.1	63.4	66.3	65.3	54.0	41.4	25.0	13.8	38.0

County Seat, Plentywood. Population County Seat, 888.
County Agricultural Agent—Yes.

*Includes Daniels.
**These figures include the territory now in Daniels county.

DANIELS COUNTY

ONE of the smaller, more recently created counties, Daniels, in northwestern Montana, has not been slow in gathering laurels. Scobey, its county seat, in 1922 laid claim to the title of being the greatest primary wheat shipping point in the United States. Two million bushels, or 1,335 cars, of the 1922 wheat crop moved from Scobey. In such quantities has it sometimes poured in from the farms that in a single day 30 cars have been loaded from farmers' wagons, without taking a pound from the elevators. Except for about 1,200 acres, non-irrigated farming is followed exclusively.

The northern boundary of Daniels adjoins Canada and it lies one county west of North Dakota. It is approximately 30 miles wide north and south and 40 miles long east and west. For years the region, which is mostly rolling prairie, was devoted exclusively to stock raising, but between

1900 and 1910 settlers flocked in and now there are less than 1,400 acres of public land remaining. Soil types are fairly uniform, sandy loams predominating except along the bottom lands of the Poplar River which carry the heavier clay types. The best crop land is located on the benches, while grazing is carried on in the valley and on the hillsides.

There are a few large flocks of sheep but the pastoral era is virtually gone, with farming as the county's only important industry. Spring wheat is the leading cash crop, accounting for about 80 per cent of the total farm receipts, and followed by dairy and poultry products and then flax. Both hard spring and macaroni varieties of wheat are grown and are of high quality. Oats, occupying about one-fourth of the acreage in wheat, is the second most important crop. Flax, a cash crop, vies with hay, a feed crop, for third place. A little rye and barley is grown. Corn is gradually assuming a place in the crop rotation plan, assuring a feed crop every year, which will permit of diversified farming and an increase in livestock, thereby lessening the risk always attendant in the one-crop system. Interest in flax reviving, a number of farmers using a mixture of wheat and flax to overcome the weeds, the worst enemy of flax. During the first years of settlement, flax was the principal crop.

An Agricultural District

While most of the country is tillable, only one-third of it is included in farms and less than a fifth of it is improved. The State of Montana owns 240,000 acres, or more than a fourth, and another sixth is included in the Fort Peck Indian reservation. Much of this reservation land is open to homestead entry, but the settler must pay the appraised price, from $8 to $12 an acre. The state land can also be purchased at auction for not less than the appraised price. It can also be leased for either farming or grazing.

Much Land Available

Two railroads serve the eastern part of the county, but the western half needs more transportation facilities for proper development. Whitetail, in the northeastern part of the county, is the terminus of a branch of the Soo. The Bainville-Plentywood branch of the Great Northern ends at Scobey in the east central part of the county.

Scobey is the largest town and most important distributing point. Whitetail is the second largest town. Madoc and Flaxville serve the needs of the heaviest wheat producing districts.

There are extensive beds of lignite coal in the county.

DANIELS COUNTY—Ranks thirty-fifth in population (5,480); forty-fifth in area (910,080 acres); seventeenth in combined 1922 crop and livestock value; thirty-fourth in bank deposits, 1922; fifty-second in assessed valuation, 1922. Acres public land, 1,360; acres state land, 241,987; acres Indian reservation (most of it allotted), 137,149.

WEALTH PRODUCTION—Estimated 1922 crop value, $2,767,000; estimated livestock value, January, 1923, $1,096,000; total bank deposits, September 15, 1922, $960,621.

TAXATION 1922—Total assessed valuation, $9,436,997; total taxable value, $2,829,174. Total outstanding county bond indebtedness, $80,000; total outstanding county warrant indebtedness, $285,758; total outstanding school bond indebtedness, $143,250; other school debts, $31,098. Total general and special county taxes, $117,797; total general and district school taxes, $103,127; total municipal taxes, $31,193; total state taxes, $13,843; total tax (inclusive municipal), per capita, $48.53.

EDUCATIONAL—Number graded schools, 44; enrollment, 1,061. Number high schools, 4; enrollment, 114.

BUSINESS STATISTICS—Number of railroads, 2; railway mileage, exclusive spurs and sidetracks, 26.99. Number of banks, 6. Number general stores, 14; confectionery, etc., 2; groceries and meats, 4; lumber yards, 9; total number merchants, 112. Total assessed valuation 1922 merchandise, $333,088. Number grain elevators, 11; total capacity, 292,000 bushels. Number flour mills, 1. Number of lawyers, 10. Number of physicians, 2.

AGRICULTURE (estimated 1922)—Number farms, 1,200; farm acreage, 336,819; improved farm acreage, 162,150; irrigated acreage, 1,075; average value all property, per farm, $11,009. Livestock assessed 1922—number cattle, 10,295; number sheep, 3,862; number horses, 10,582.

CLIMATOLOGICAL DATA—Not available. See Sheridan County.

County Seat, Scobey. Elevation, 2,458 feet. Population County Seat, 1,170.

County Agricultural Agent—Yes.

VALLEY COUNTY

ONE of the largest counties of the state in area, the possibilities of agriculture in Valley are just being apprehended. When they are fully developed it will rank then, as it does now, among the leaders in crop and livestock production. It already possesses a considerable acreage of irrigated land that is not all in use, and projects under construction will more than double the amount under water.

Valley county lies in northeastern Montana. It stretches from the Canadian boundary southward to the Missouri River a maximum distance of 100 miles and extends east and west about 65 miles. Aside from the bottom lands along the Missouri River that part of the county north of the Missouri and south of the Milk Rivers is almost all too rough and cut up by badlands to be adapted to other than stock-raising purposes. The irrigated land and that included in projects under construction lies almost wholly within the Milk River valley and east of the confluence of the Milk and the Missouri along the latter stream. Most of the land now irrigated is in the Milk River project of the U. S. Reclamation Service, and most of the land to be irrigated is either in the same project or in the Fort Peck project of the Indian Service. On the north side of the Milk River valley are rolling uplands that stretch north into Canada. Soil types vary from silt and clay loams in the bottoms to sandy and gravelly loams on the uplands.

There is more non-irrigated than irrigated farming. Spring wheat is the chief crop, with oats, flax, corn and rye next in order. Along the Missouri River bottoms, particularly in those districts remote from the railroad, alfalfa is the principal crop, which is marketed as seed. Valley is one of the leading seed-producing counties. Most of the farms in the irrigated districts are large, and their chief product is "blue joint" hay, a native hay of high nutritive quality. Alfalfa is also raised. The acreage in corn is rapidly expanding and there is a decided bent at present toward a more diversified system of farming, smaller irrigated holdings, and more farm livestock. More attention is being given dairying and a co-operative creamery was established (1922) at Glasgow. The cattle and sheep range industry continues important. Small flocks of sheep are found on some of the farms.

Coal is found in some parts of the county and also brick clay. Drilling for oil is projected.

The main line of the Great Northern follows the Milk River valley through the county. The non-irrigated districts in the northern part of the county are retarded in development because of the long haul to the railroad.

Glasgow, the county seat, is the largest town in the county as well as in northeastern Montana. It has all modern municipal improvements. Other towns on the railroad are Oswego, Frazer, Nashua and Hinsdale. Glentana is the largest community in the northern district.

VALLEY COUNTY—Ranks fifteenth in population (10,533); seventh in area (3,240,960 acres); sixth in combined 1922 crop and livestock value; nineteenth in bank deposits, 1922; sixteenth in assessed valuation, 1922. Acres public land, 568,275; acres state land, 231,454; acres Indian reservations (most of it allotted), 677,836.

WEALTH PRODUCTION—Estimated 1922 crop value, $2,656,400; estimated livestock value, January, 1923, $2,893,300; total bank deposits, September 15, 1922, $1,954,599.

TAXATION 1922—Total assessed valuation, $26,767,434; total taxable value, $8,425,702. Total outstanding county bond indebtedness, $637,000; total outstanding county warrant indebtedness, $76,806; total outstanding school bond indebtedness, $221,979; other school debts, $13,566. Total general and special county taxes, $237,770; total general and district school taxes, $223,845; total municipal taxes, $3,408; total state taxes, $40,829; total tax (inclusive municipal), per capita, $48.02.

EDUCATIONAL—Number graded schools, 94; enrollment, 2,212. Number high schools, 3; enrollment, 222.

BUSINESS STATISTICS—Number of railroads, 1; railway mileage, exclusive spurs and sidetracks, 76.45. Number of manufactures, 19; average number wage earners, 35; value of products, $412,614. Number of banks, 15. Number general stores, 31; confectionery, etc., 5; groceries and meats, 16; lumber yards, 12; total number merchants, 205. Total assessed valuation 1922 merchandise, $681,992. Number grain elevators, 17; total capacity, 407,000 bushels. Number creameries, 1. Number flour mills, 2. Number of lawyers, 18. Number of physicians, 9.

AGRICULTURE (1920 census)*—Number farms, 2,169; farm acreage, 1,126,872; improved farm acreage, 344,335; irrigated acreage, 20,890; average value all property, per farm, $10,386. Livestock assessed 1922—number cattle, 24,680; number sheep, 59,983; number horses, 25,921; number swine (census), 2,680.

CLIMATOLOGICAL DATA—At Glasgow. Elevation, 2,092 feet. Average date last killing frost in spring, May 21; average date first killing frost in fall, September 17.

	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Ave. Prec.	.61	.48	.98	.96	2.29	2.57	1.4	1.11	1.05	.67	.50	.55	13.17
Ave. Temp.	8 0	10.8	24.4	44.0	55.2	63.6	70.0	67.9	56.2	43.6	26.8	15.0	40.5

County Seat, Glasgow. Population County Seat, 2,059.
County Agricultural Agent—Yes.

*These figures include the territory now in Daniels County.

PHILLIPS COUNTY

AN ASPIRANT to the distinction of having the largest acreage in 1923 devoted to corn of any county in the state, the Phillips county claim is undisputed in the region lying north of the Missouri River, but the official figures will be required to determine the titleholder. A new county agriculturally, Phillips in the last year or two has made progress and when its tillable and irrigated lands are all settled and farmed it seems destined to be one of the leading agricultural districts of the state.

It lies in north central Montana, extending from the Canadian boundary on the north to the Missouri River on the south, approximately 100 miles in length by 50 miles east and west. In the southwestern corner the Little Rocky Mountains, an isolated mountain range, arise. Soil types are quite uniform, varying from clay loams along the valley of the Milk River which occupies the middle of the county, east and west, to sandy loams on the uplands and undulating prairie which stretch northward into Canada. Much of the land in the south half of the county is rolling and broken, especially adapted to grazing purposes.

Wheat has been the principal cash crop on the non-irrigated, and blue joint hay on the irrigated lands, but there are many evidences of change in the crop program. On the non-irrigated lands the increase of acreage devoted to corn has been phenomenal. While wheat will probably continue to be the chief cash crop, corn is bringing in hogs and chickens and turkeys and winter feeding of sheep and cattle. Idaho colonists who recently settled on the irrigated lands in the Milk River valley

Diversification Is Growing

have gone in for diversified farming that included small grains, corn, sugar beets and potatoes. They had good success with these crops and indications are the acreage in sugar beets will be considerably increased the next crop season, perhaps leading eventually to the establishment of a sugar beet factory. Much irrigated land in the Milk River project of the government is not being farmed at all, or is only devoted to native blue joint hay. Arrangements have been made under which surplus private holdings are offered at reasonable prices on easy terms. Alfalfa ranks next to blue joint in importance as a forage crop. It is also grown as a seed crop, and around Saco, where the Grimm variety predominates, a Grimm seed association has been organized. Potatoes are becoming an important crop in this county. At the Pacific Northwest Potato Show in 1922, in competition with growers from seven states, Phillips county took first on Irish cobblers. Seed from Phillips county was included in the Montana potatoes that scored highest in competion with seed from many other states in a test conducted by the Louisiana Experiment station. A noted pastoral region in the old days, stock growing, in value of products, is still dominant and in the southern part of the county is conducted on a large-scale range basis.

For many years gold and silver mining has been carried on in the Little Rocky Mountains, and Phillips county has been an important producer. A revival of the industry there was noted in 1923. There are extensive lignite coal fields in the county, and near the Little Rockies, one of the larger oil companies is drilling for oil.

The main line of the Great Northern follows the course of the Milk River through the county and is paralleled by the Roosevelt Memorial highway. A secondary highway from Lewistown enters the county on the south and runs to Malta. A secondary highway runs from Malta into Canada connecting with a road to Moose Jaw.

Malta, the county seat, is the largest town and principal trading center. Saco is a distributing point in the east end of the county, and Zortman, in the southwestern district, for the Little Rockies region.

Lake Bowdoin, east of Malta, is one of the finest duck hunting regions in the west. The Little Rockies region is rich in romance, dating from the days of the fur trader and the Indian down to the time when the "Kid" Curry outlaw gang made its headquarters there.

PHILLIPS COUNTY—Ranks nineteenth in population (9,311); third in area (3,313,920 acres); eleventh in combined 1922 crop and livestock value; twenty-eighth in bank deposits, 1922; twenty-sixth in assessed valuation, 1922. Acres public land, 662,504; acres state land, 171,886; acres national forests, 28,317; acres unallotted Indian reservations, 121,317.

WEALTH PRODUCTION—Estimated 1922 crop value, $1,715,000; estimated livestock value, January, 1923, $2,628,000; total bank deposits, September 15, 1922, $1,157,268.

TAXATION 1922—Total assessed valuation, $21,392,602; total taxable value, $6,755,954. Total outstanding county bond indebtedness, $581,500; total outstanding county warrant indebtedness, $58,295; total outstanding school bond indebtedness, $311,104; other school debts, $4,111. Total general and special county taxes, $206,880; total general and district school taxes, $185,851; total municipal taxes, $17,261; total state taxes, $32,925; total tax (inclusive municipal), per capita, $47.56.

EDUCATIONAL—Number graded schools, 105; enrollment, 1,810. Number high schools, 4; enrollment, 171.

BUSINESS STATISTICS—Number of railroads, 1; railway mileage, exclusive of spurs and sidetracks, 52.24. Number of manufactures, 13; average number wage earners, 98; value of products, $203,229. Number of banks, 7. Number general stores, 24; confectionery, etc., 9; groceries and meats, 17; lumber yards 8; total number merchants, 144. Total assessed valuation 1922 merchandise, $362,880. Number grain elevators, 14; total capacity, 348,000 bushels. Number creameries, 1. Number flour mills, 1. Number saw mills, 1. Number lawyers, 12. Number of physicians, 5.

AGRICULTURAL (1920 census)—Number farms, 1,914; farm acreage, 1,084,725; improved farm acreage, 227,811; irrigated acreage, 28,047; average value all property, per farm, $11,249. Livestock assessed 1922—number cattle, 24,626; number sheep, 58,901; number horses, 20,065; number swine (census), 1,735.

CLIMATOLOGICAL DATA—At Malta. Elevation, 2,250 feet. Average date last killing frost in spring, May 21; average date first killing frost in fall, September 25.

	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Aver. Prec.	.58	.43	.43	.69	2.22	3.57	1.85	1.23	1.24	.55	.40	.39	13.58
Aver. Temp.	8.6	12.6	26.2	44.2	54.0	63.8	69.8	67.9	56.8	44.4	29.6	15.3	41.1

County Seat, Malta. Population County Seat, 1,427.

County Agricultural Agent—Yes.

NORTH CENTRAL MONTANA

Farming, Stockraising, Oil and Coal Production Are the Chief Industries—Eastern Half of the Glacier National Park on Western Border—Most of the Area in Plains Region.

Including within its area the eastern half of the Glacier National Park the North Central district stretches far eastward. Most of it is included within the plains region, but the western part and some isolated mountain ranges belong to the eastern slopes region. Blaine, Hill, Choteau, Liberty, Teton, Pondera, Toole and Glacier counties are in it.

The only irrigated district of any size in the eastern part is in the Milk River valley. There is considerable irrigated land in the western part, and the reclamation of more is projected. Non-irrigated farming predominates. Moisture has been the chief factor limiting crop production. Livestock is a more important source of wealth than crops. The district is new in a farming sense, however, and a type best adapted to it is being evolved. More settlers and smaller farm units are a need of most of the irrigated regions. Areas in the western and southern parts are naturally adapted to stockgrowing.

Spring wheat is the principal cash crop, in which the district ranks third. It leads in rye, and ranks well forward in hay, both tame and wild. Good results have been had with corn, except at the higher altitudes near the mountains.

Coal is mined commercially in Hill and Choteau counties. More drilling for oil and gas is probably being done in this than in any other part of the state. Gas in large quantities has been found in half a dozen districts, but the only commercial oil field up to the present (1923) is the Kevin-Sunburst in Toole county.

The elevation of the tillable areas range from 2,900 to 5,000 feet. The highest altitudes are upwards of 10,000 feet in the Glacier National Park. The growing season is more than four months in the eastern part and about three months and a half in the western.

BLAINE COUNTY

RAPID strides in an agricultural way are being made in Blaine county through diversified farming, irrigated land and co-operation. It offers good opportunities to the settler. It ranks fourth in combined 1922 crop and livestock value and boasts of more pure-bred hogs than any other county. Its principal commodities are cattle, grain, sheep, coal, hogs, wool, horses, hides and hay. Construction is under way for the reclamation of an additional 23,000 acres of land, the work to be completed in October, 1924.

Located in north central Montana with its northern boundary adjoining Canada, Blaine county is approximately 75 miles long, north and south, and 45 miles wide, east and west. The Bear Paw mountains cross the central and southern parts of the county, making this region principally grazing land. The Fort Belknap Indian

reservation occupies the southwestern part of the county. Soil types vary from chocolate loam to the heavier clay loams on the bottom lands adjacent to the Milk River valley, which runs east and west through the central part.

An Old Range District

In the early days this region was one of the important range districts, the southern part of the county being settled by ranchmen who ran both sheep and cattle, grazing them through the northern part of the county and into Canada. With its settlement about 1910, all the northern district was relinquished by the stockmen and is now devoted to non-irrigated farming, as is the area south of the Milk River valley, extending to the foothills of the Bear Paw mountains. The southern part is still almost wholly devoted to stock raising, the valleys in the Bear Paws being fertile and producing plenty of feed to maintain large herds of both sheep and cattle. Small private irrigation plants are scattered through the northern region and the bottom lands of the Milk River valley and are practically all under irrigation through the organization of private irrigation projects between Chinook and Harlem. Water is secured from the government Milk River reclamation project and covers the bottom lands of the lower Milk River valley. These irrigated areas in Blaine county probably offer as cheap irrigated land as are to be had in the state. Alfalfa, blue joint and timothy are the leading feed crops grown in the irrigated areas, with oats, barley, wheat and corn the leading cereals. Considerable development work is being done with sugar beets, and it is probable that this crop will be added to the list of those grown on the irrigated lands. A big increase in corn acreage on both non-irrigated and irrigated lands has taken place in recent years and this crop now has taken a prominent place in rotations.

Co-operative Marketing

The Blaine County Marketing Association and the Purebred Swine Growers' Associations are among the most flourishing co-operative associations in the state. More than usual interest is being taken in swine and poultry raising.

The main line of the Great Northern runs through the heart of the county, and is paralleled by the Roosevelt Memorial highway. Chinook, the county seat, and Harlem are the most important towns. Both are modern and up to date. Many farm families move in from outlying districts during the winter months to give their children the modern school advantages that are available. Other towns and trading centers are Coburg, Zurich, Savoy and Lohman.

The Battle of the Bear Paws where, October 5, 1877, Chief Joseph surrendered to General Nelson A. Miles, was fought in the southwestern part of Blaine county. It brought to an end an Indian journey which, for rapidity, resourcefulness and daring, military experts say is comparable to Hannibal's passage across the Alps. Relics of the fight are unearthed from time to time.

Blaine county has extensive deposits of lignite coal. It also has clay deposits suitable for brick making.

BLAINE COUNTY—Ranks twenty-second in population (9,057); ninth in area (2,706,560 acres); fourth in combined 1922 crop and livestock value; nineteenth in 1920 mineral production; twenty-fifth in bank deposits, 1922; twenty-second in assessed valuation, 1922. Acres public land, 205,040; acres state land, 156,459; acres Indian and other reservations, 501,601.

WEALTH PRODUCTION—Estimated 1922 crop value, $1,715,000; estimated livestock value, January, 1923, $3,829,200; coal production, 1920, $42,000; 1921 lumber cut, 500 M feet; total bank deposits, September 15, 1922, $1,248,653.

TAXATION 1922—Total assessed valuation, $22,515,412; total taxable value, $7,122,510. Total outstanding county bond indebtedness, no data; total outstanding county warrant indebtedness, no data; total outstanding school bond indebtedness, $137,388; other school debts, $24. Total general and special county taxes, $189,721; total general and district school taxes, $156,173; total municipal taxes, $36,701; total state taxes, $35,451; total tax (inclusive municipal), per capita, $46.15.

EDUCATIONAL—Number graded schools, 83; enrollment, 1,613. Number high schools, 3; enrollment, 240.

BUSINESS STATISTICS—Number of railroads, 1; railway mileage, exclusive spurs and sidetracks, 55.34. Number of manufactures, 10; average number wage earners, 14; value of products, $163,011. Number of banks, 10. Number general stores, 21; confectionery, etc., 4; groceries and meats, 13; lumber yards, 5; total number merchants, 133. Total assessed valuation 1922 merchandise, $498,467. Number grain elevators, 13; total capacity, 313,000 bushels. Number creameries, 1. Number flour mills, 2. Number saw mills, 1. Number of lawyers, 10. Number of physicians, 5.

AGRICULTURE (1920 census)—Number farms, 1,761; farm acreage, 1,159,056; improved farm acreage, 291,431; irrigated acreage, 59,119; average value all property, per farm, $13,103. Livestock assessed 1922—number cattle, 36,549; number sheep, 105,642; number horses, 17,832; number swine (census), 1,677.

CLIMATOLOGICAL DATA—At Chinook. Elevation, 2,502 feet. Average date last killing frost in spring, May 14; average date first killing frost in fall, September 18.

	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Ave. Prec.	.63	.37	.43	.76	2.09	2.56	1.41	1.16	1.36	.70	.51	.46	12.44
Ave. Temp.	14.1	15.9	26.0	44.1	54.4	63.5	70.0	67.1	56.0	45.3	30.1	20.2	42.2

County Seat, Chinook. Population County Seat, 1,217.
County Agricultural Agent—Yes.

HILL COUNTY

AGRICULTURALLY, one of the newer counties of the state, Hill county, in north central Montana, is just beginning to find the most successful farming methods that are adapted to the region. The era of settlement was about 1910, and, as is true of all new regions, the one-crop system has predominated but diversification is making progress. Non-irrigated farming is followed almost exclusively. A project for the reclamation of 200,000 acres in the southern part of the county is projected. One of the first commercial natural gas developments in Montana was at Havre in this county. Considerable interest is being evinced in oil prospects. Coal mining is the most important industry aside from farming and stock raising. In 1922 there were 10 coal mines operated with an output of 50,000 to 55,000 tons, valued at approximately $25,000.

The International boundary is the northern line of the county which is about sixty miles in length and width. The southeastern corner extends into the Bearpaw mountains where the Rocky Boy Indian Agency is located. Fort Assiniboine, near Havre, for many years an important frontier post, is now the Northern Montana Agricultural Experiment Station. Except in the vicinity of the Bear Paw mountains, most of the surface consists of rolling prairies and bench lands. A fertile sandy loam is the prevailing soil type, on which blowing sometimes causes trouble.

In the old range days Hill county was an important livestock region, and it seems strange little attention is given stock now, but this can be accounted for because the district is new, in a farming sense, and the one-crop system has prevailed. Moisture is the controlling factor in crop production and safe farming calls for special methods to conserve it. Acclimated varieties of corn do well here and furnish forage for livestock. The most successful farmers have been those handling large acreages—300 to 500 acres cropped each year—with a minimum of hired labor, through the use of ten to twelve horse one-man outfits, and who, in addition, raise most of their own farm and livestock living. Shelter belt plant-

All Farming Now

ings by a few farmers on the non-irrigated treeless prairies have demonstrated that every farm where the owner takes the interest can have a grove of trees. The initial photograph shows what can be done. Spring wheat, oats and flax are the chief crops. The acreage in corn is increasing. There is some commercial production of potatoes.

Coal and natural gas are the principal mineral products, although there has been some commercial utilization of clay beds for brick and of sandstone for building purposes.

The Winter Climate

The winter climate of this region is much warmer than the minimum extremes occasionally recorded at Havre would indicate. Records of the U. S. Weather Bureau show that the mean January temperature of Havre is 13.5 degrees, compared with 10.4 degrees at Duluth, Minnesota, or 11.6 degrees at St. Paul, or 0.3 degrees at Devil's Lake, North Dakota. It should also be remembered that the Montana climate is exceedingly dry, making extreme minimum temperatures much more bearable than higher temperatures in more humid regions.

The main line of the Great Northern crosses the county east and west, and at Havre the Butte branch runs southwesterly through the county. The Roosevelt Memorial Highway follows the main line of the railroad.

Havre, the county seat, is the largest town and modern in all respects. It is a railroad division point and shops are maintained there. Rudyard, Hingham, Gildford and Kremlin, on the main line, and Box Elder on the Butte branch, serve important farming areas.

Attractive scenically, the Bearpaw mountains are of historic interest dating from the days of the trappers to those of Indian warfare. The region is becoming a recreational center for northern Montana. Picturesque badlands are a feature of the Milk River, which enters this county from Canada and then turns eastward.

HILL COUNTY—Ranks eleventh in population (13,958); eighteenth in area (1,850,880 acres); thirty-second in combined 1922 crop and livestock value; seventeenth in 1920 mineral production; twenty-second in bank deposits, 1922; tenth in assessed valuation, 1922. Acres public land, 42,760; acres state land, 117,599; acres Indian reservation (all unallotted), 39,040.

WEALTH PRODUCTION—Estimated 1922 crop value, $1,672,300; estimated livestock value, January, 1923, $1,336,000; coal production, 1920, $65,000; total bank deposits, September 15, 1922, $1,515,516.

TAXATION 1922—Total assessed valuation, $33,313,564; total taxable value, $10,412,861. Total outstanding county bond indebtedness, $1,092,000; total outstanding county warrant indebtedness, $5,629; total outstanding school bond indebtedness, $438,313; other school debts, $33,265. Total general and special county taxes, $237,481; total general and district school taxes, $260,542; total municipal taxes, $59,375; total state taxes, $48,737; total tax (inclusive municipal), per capita, $43.42.

EDUCATIONAL—Number graded schools, 84; enrollment, 2,268. Number high schools, 8; enrollment, 400.

BUSINESS STATISTICS—Number of railroads, 1; railway mileage, exclusive spurs and sidetracks, 81.16. Number of manufactures, 25; average number wage earners, 414; value of products, $1,060,142. Number of banks, 13. Number general stores, 22; confectionery, etc., 7; groceries and meats, 33; lumber yards, 8; total number merchants, 253. Total assessed valuation 1922 merchandise, $847,955. Number grain elevators, 27; total capacity, 906,000 bushels. Number creameries, 1. Number flour mills, 3. Number of lawyers, 29. Number of physicians, 13.

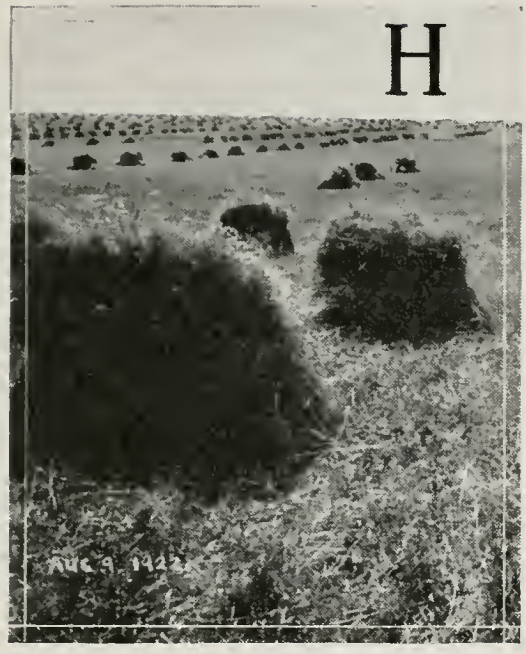
AGRICULTURE (1920 census)—Number farms 2,257; farm acreage, 1,107,399; improved farm acreage, 491,358; irrigated acreage, 2,528; average value all property per farm, $12,005. Livestock assessed 1922—number cattle, 12,863; number sheep, 10,552; number horses, 14,032; number swine (census), 1,772.

CLIMATOLOGICAL DATA—At Havre. Elevation, 2,505 feet. Average date last killing frost in spring, May 16; average date first killing frost in fall, September 19.

	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Ave. Prec.	.78	.51	.53	.90	1.90	2.74	1.81	1.20	1.27	.69	.63	.58	13.54
Ave. Temp.	12.5	13.8	27.0	43.7	53.1	61.5	68.0	66.0	55.8	44.2	30.2	21.0	41.4

County Seat, Havre. Population county seat, 5,429.
County Agricultural Agent—No.

CHOUTEAU COUNTY



HEADQUARTERS for the fur trade of the Upper Missouri in early days, after 1860 the head of river navigation and an important supply point in territorial times, later still a stockman's paradise in the open range era, Chouteau county at present is treading along diverse paths—livestock and mixed farming in some districts, big scale farming in other districts, and in still others the development of big natural gas wells and energetic drilling for oil. Farming and stock raising, at present, are the chief industries.

Chouteau county lies in north central Montana, with an extreme width east and west of 87 miles and a maximum length of 60 miles. The northeast corner extends into the Bearpaw mountains and the Highwood mountains form the south central border. The Missouri River enters at the southwest, and after being joined by the Teton and Marias Rivers, near the center of the county, makes a big bend to the southeast.

Early Day Stock Raising

Stock raising was first undertaken in what is now Montana between 1832-34 at Fort McKenzie, situated on the left bank of the Missouri River six miles above the mouth of the Marias. Alexander Culbertson, in charge of the post, writes they had 30 to 40 horses, 10 or 12 cattle, a number of hogs, "and one of the most splendid Durham bulls that can be found in the United States". Culbertson was a generation ahead of the times, and it was not until the early seventies that the range industry became established, flourishing until the settlers came in between 1900 and 1910. It is found today only in the mountainous districts. Little attention is as yet being given by the farmers on non-irrigated lands to livestock. Soil types vary, but in the main are fertile and suitable for farming. Some soil blowing occurs on the lighter soils when improperly handled. The topography is favorable to large scale farming, consisting mostly of broad benchlands with little rough or broken lands. Moisture is a limiting factor in crop production, necessitating, for successful farming, special methods of intensive moisture conservation. Successful farmers are replacing the one-crop system common to all new countries with diversified methods, the handling of maximum acreages at a minimum of cost and outside labor, and the growing of feed for livestock. Corn is rapidly becoming one of the main crops.

There is a small acreage along the three rivers that is being irrigated through the use of water wheels and electrically actuated pumps. It is asserted the costs are considerably lower than on most irrigation projects. Additional large acreages are susceptible of irrigation by this method. In the western part of the county a large tract of land is included in a proposed extension of the Sun River project of the U. S. Reclamation Service. There has been some slight utilization by individual farmers of floodwaters now going to waste. Thousands of acres in this county could be given one soaking floodwater irrigation which oftentimes would be sufficient ot insure a crop. An irrigation district for the reclamation of 50,000 acres in the northern part of the county and 200,000 acres in Hill county is projected.

Coal has been mined on a small scale in the county for many years. Near the eastern boundary, while drilling for oil in 1923, a flow of natural gas estimated at 5,000,000 cubic feet was encountered. Drilling for oil is under way at several other places in the county. Eastern capital has become interested in a project for the recovery of sodium crystals from lake beds near Montague.

Coal and Gas

The Havre-Butte branch of the Great Northern runs northeasterly through the central part of the county. The Lewistown-Great Falls branch of the Chicago, Milwaukee and St. Paul makes a loop through the southeastern district.

Fort Benton, the county seat, established as a trading post in 1846, is the oldest town in Montana east of the main range. From 1860 to 1880 steamers plied on the Missouri between there and St. Louis. With the passing of river navigation its importance declined but when the farming era began its central location made it again a trading and distributing point. Big Sandy is the principal town and trading center in the northern part and Geraldine in the southeastern area of the county.

CHOUTEAU COUNTY—Ranks fourteenth in population (11,051); tenth in area (2,532,480 acres); sixteenth in combined 1922 crop and livestock value; twenty-third in 1920 mineral production; seventeenth in bank deposits, 1922; ninth in assessed valuation, 1922. Acres public land, 88,518; acres state land, 182,571; acres national forests, 29,697; acres Indian reservations (unallotted), 15,480.

WEALTH PRODUCTION—Estimated 1922 crop value, $1,359,000; estimated livestock value, January, 1923, $2,509,500; coal production, 1920, $16,200; total bank deposits, September 15, 1922, $2,072,753.

TAXATION 1922—Total assessed valuation, $33,989,001; total taxable value, $10,756,090. Total outstanding county bond indebtedness, $1,097,000; total outstanding county warrant indebtedness, $16,068; total outstanding school bond indebtedness, $160,452; other school debts, $42,219. Total general and special county taxes, $210,101; total general and district school taxes, $281,770; total municipal taxes, $22,334; total state taxes, $51,208; total tax (inclusive municipal), per capita, $51.16.

EDUCATIONAL—Number graded schools, 121; enrollment, 2,325. Number high schools, 6; enrollment, 344.

BUSINESS STATISTICS—Number of railroads, 2; railway mileage, exclusive spurs and sidetracks, 138.63. Number of manufactures, 10; average number wage earners, 12; value of products, $140,252. Number of banks, 15. Number general stores, 28; confectionery, etc., 6; groceries and meats, 12; lumber yards, 10; total number merchants, 207. Total assessed valuation 1922 merchandise, $755,966. Number grain elevators 35; total capacity, 828,000 bushels. Number flour mills, 2. Number of lawyers, 14. Number of physicians, 5.

AGRICULTURE (1920 census)—Number farms, 2,573; farm acreage, 1,508,898; improved farm acreage, 599,542; irrigated acreage, 6,029; average value all property per farm, $16,326. Livestock assessed 1922—number cattle, 25,890; number sheep, 39,856; number horses, 17,693; number swine (census), 3,246.

CLIMATOLOGICAL DATA—At Fort Benton. Elevation, 2,565 feet. Average date last killing frost in spring, May 11; average date first killing frost in fall, September 23.

	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Ave. Prec.	.74	.45	.57	1.15	2.67	2.44	1.59	1.00	1.10	.64	.54	.55	13.44
Ave. Temp.	18.4	22.2	31.0	45.1	55.0	63.0	69.4	67.3	56.7	46.5	31.9	23.4	44.2

County Seat, Fort Benton. Population County Seat, 1,065.
County Agricultural Agent—Yes.

TETON COUNTY

FOR many years one of the leading livestock regions of Montana, stock raising still continues the dominant industry in Teton county, though agriculture is not far behind. When the agricultural areas are developed and the irrigated and irrigable lands come into production, agriculture will easily be in the lead. The western part, however, will probably always continue to be devoted to stock raising.

Teton county lies in north central Montana, extending eastward from the crest of the continental divide a distance of 70 miles, and from the North Fork of the Sun River which defines its southern boundary northward about 40 miles. The eastern two-thirds of the county is composed of broad valleys and rolling bench lands, of an average elevation of 3,500 to 4,000 feet. Steep rugged mountains occupy most of the area of the western third. The Teton and Sun Rivers and Willow and Muddy Creeks are the principal streams, whose waters are gathered from numerous mountain tributaries.

Both irrigated and non-irrigated farming is followed, with spring wheat as the chief crop in acreage and value, followed by wild hay, oats, tame hay and flax. Much land in the county is irrigated, but some is not being used. Projects under construction and contemplated will reclaim an additional 70,000 to 170,000 acres. When all the irrigable land is reclaimed, it will be one of the best watered counties in the state. While the acreage in wild hay greatly exceeds that of tame hay, more areas are being seeded on the irrigation projects each year to alfalfa. In some of the non-irrigated districts there are opportunities for flood-water irrigation by diversion from coulees and spring freshets over the land. The best known non-irrigated district is the Porter bench which has never had an entire crop failure. Other non-irrigated districts are the Teton Ridge, East Dutton, Power and Bole. Some lands lying along the foothills of the Rockies, rocky and rolling in character, were farmed during the height of the land settlement movement in Montana, but are gradually going back to range purposes. Agriculturally, this county is just getting under way. The main reliance has been wheat, on both the irrigated and the non-irrigated lands, but a trend toward diversification is noticeable. Though on a small scale, commercial potato production has been successful, and dairy cattle and hogs are beginning to appear in the irrigated districts where alfalfa is expanding.

Coal is found at a few places in the county, and drilling for oil is actively under way (1923) at a number of places. Some good-sized flows of natural gas were struck, but cased off so drilling for oil could be continued.

The central and eastern portions of the county enjoy excellent railway facilities. The Shelby-Great Falls line of the Great Northern, which is used by the coast trains of the Burlington, and the Great Northern trains to Sweet Grass, on the International border, traverse the eastern third of the county. A branch line from Power, running east and north, serves the central district. A branch line of the Chicago, Milwaukee & St. Paul, out of Great Falls, also taps the central part.

Founded during the days of the range herds and the Indian trader, Choteau, the county seat, near the geographical center of the county, is the largest town

and chief distributing and supply point. It has all modern municipal improvements. Dutton, Collins and Power, in the eastern district, Fairfield and Agawam, on the Milwaukee, and Boyle, Bynum and Pendroy, on the Great Northern, in the central district, are shipping points.

The western part of the county is noted for its scenery, fishing and big game hunting. The best hunting regions are accessible only by pack outfits.

TETON COUNTY—Ranks thirty-second in population (5,870); thirty-first in area (1,430,400 acres); thirty-fifth in combined 1922 crop and livestock value; thirty-ninth in bank deposits, 1922; twenty-third in assessed valuation, 1922. Acres public land, 37,882; acres state land, 81,135; acres national forests, 249,896.

WEALTH PRODUCTION—Estimated 1922 crop value, $1,275,000; estimated livestock value, January, 1923, $1,382,500; 1921 lumber cut, 134 M feet; total bank deposits, September 15, 1922, $771,473.

TAXATION 1922—Total assessed valuation, $22,297,947; total taxable value, $6,897,454. Total outstanding county bond indebtedness, $698,334; total outstanding county warrant indebtedness, $25,175; total outstanding school bond indebtedness, $257,654; other school debts, $13,194. Total general and special county taxes, $230,673; total general and district school taxes, $150,359; total municipal taxes, $18,316; total state taxes, $32,749; total tax (inclusive municipal), per capita, $73.61.

EDUCATIONAL—Number graded schools, 71; enrollment, 1,264. Number high schools, 3; enrollment, 218.

BUSINESS STATISTICS—Number of railroads, 2; railway mileage, exclusive spurs and sidetracks, 116.26. Number of manufactures, 9; average number wage earners, 147; value of products, $283,826. Number of banks, 9. Number general stores, 19; confectionery, etc., 2; groceries and meats, 6; lumber yards, 7; total number merchants, 132. Total assessed valuation 1922 merchandise, $529,961. Number grain elevators, 26; total capacity, 774,000 bushels. Number creameries, 1. Number flour mills, 1. Number saw mills, 2. Number of lawyers, 8. Number of physicians, 7.

AGRICULTURE (1920 census)—Number farms, 1,135; farm acreage, 613,506; improved farm acreage, 234,833; irrigated acreage, 55,433; average value all property, per farm, $17,846. Livestock assessed 1922—number cattle, 16,331; number sheep, 25,834; number horses, 9,038; number swine (census), 2,002.

CLIMATOLOGICAL DATA—AT Choteau. Elevation, 3,815 feet. Average date last killing frost in spring, May 25; average date first killing frost in fall, September 14.

	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	An-
Ave. Prec.	.77	.55	.47	.76	2.	3.2	1.85	.96	.94	.47	.42	.55	12.94
Ave. Temp.	23.1	22.8	34.0	41.1	48.9	57.8	64.9	62.1	54.3	44.5	33.4	28.4	42.9

County Seat, Choteau. Population County Seat, 1,043.
County Agricultural Agent—Yes.

PONDERA COUNTY

ONE of the more recently settled districts of Montana, Pondera county, in the north central part of the state, is beginning to find the methods and crop systems best adapted to agriculture, which is its most important industry, and the one capable of the greatest expansion. The western third of the county is mountainous and broken and adapted to livestock production, the middle portion is the irrigated district and the eastern third is devoted chiefly to non-irrigated farming.

The continental divide of the Rocky Mountains marks the western boundary and the county stretches eastward about 75 miles. The Marias River defines part of its northern boundary from which it extends south 25 miles. Soil types are fairly uniform, ranging from a chocolate-brown clay loam to a sandy loam, from five to eight feet in depth and underlain with sandstone or gravel. The agricultural areas range from 3,800 to 4,500 feet elevation.

Much Irrigated Land

Stock raising for many years was the leading industry, but with the settlement of the lands in the eastern part of the county and the building of a large Carey irrigation project in the middle part, was restricted to the rougher lands and the national forest areas in the western district. Water is available for about 125,000 acres of land in the Carey project of the Valier Montana Land and Water Company, but considerable of it has not yet been settled. The irrigated district is well adapted to all types of farming and there is a strong tendency at present toward diversification and 80-acre farms, with dairying, swine and poultry raising important enterprises. Four pure-bred dairy bull associations were formed in the county in 1923 and many high-grade Guernsey and Holstein cows have been shipped in. In 1922 the county shipped 5,000 head of turkeys. A turkey growers' association has been formed.

Wheat, oats and barley are the principal grain crops in both the irrigated and non-irrigated districts. Alfalfa is the chief forage crop on irrigated lands. Farmers on non-irrigated lands in the lower altitudes are turning to corn as a feed crop. Moisture is the controlling factor of crop production in the non-irrigated districts east of the Great Northern line.

Coal exists in the county and at several places drilling for oil is being done.

The Billings-Shelby line of the Great Northern, used by the through coast trains of the Burlington, runs north across the eastern part of the county. An independent railroad runs northwesterly from Conrad to Valier, serving the irrigated district. Pendroy, in Teton county, a few miles from the southern boundary, is the terminus of a Great Northern branch which serves the southwestern part of Pondera county. The main highway of the eastern Park-to-Park route crosses the western part of the county and there are other north and south highways direct to Great Falls, Shelby and Choteau.

Conrad, in the eastern district, is the county seat and the largest community. It has all modern municipal improvements and is substantially built. It is the shipping and distributing center of a large area. Valier, in the heart of the irrigated district, is the second largest town and has modern improvements. At Williams, lying between Valier and Conrad, is a modern creamery whose products are in demand on Montana markets. Brady and Fowler, in the non-irrigated districts, and Dupuyer, in the stock-raising region, are trade centers.

Fishing and hunting are enjoyed in the mountains in the western part of the county. Near Dupuyer, on Birch Creek, the highest rock filled dam in the United States has been built, to store irrigation water.

PONDERA COUNTY—Ranks thirty-third in population (5,741); twenty-ninth in area (1,061,120 acres); twenty-ninth in combined 1922 crop and livestock value; twenty-second in 1920 mineral production; twenty-ninth in bank deposits, 1922; thirty-ninth in assessed valution, 1922. Acres public land, 8,702; acres state land, 43,930; acres national forests, 121,616; acres Indian reservations (partially patented), 162,213.

WEALTH PRODUCTION—Estimated 1922 crop value, $1,796,800; estimated livestock value, January, 1923, $1,270,400; coal production, 1920, $18,000; total bank deposits, September 15, 1922, $1,130,256.

TAXATION 1922—Total assessed valuation, $16,565,215; total taxable value, $5,152,565. Total outstanding county bond indebtedness, $544,000; total outstanding county warrant indebtedness, $24,051; total outstanding school bond indebtedness, $151,767; other school debts, $3,876. Total general and special county taxes, $84,736; total general and district school taxes, $129,717; total municipal taxes, $20,087; total state taxes, $24,620; total tax (inclusive municipal), per capita, $45.14.

EDUCATIONAL—Number graded schools, 56; enrollment, 1,181. Number high schools, 3; enrollment, 200.

BUSINESS STATISTICS—Number of railroads, 2; railway mileage, exclusive of spurs and sidetracks, 56.60. Number of manufactures, 7; average number wage earners, 4; value of products, $40,488. Number of banks, 8. Number general stores, 16; confectionery, etc., 2; groceries and meats, 4; lumber yards, 8; total number merchants, 116. Total assessed valuation 1922 merchandise, $531,651. Number grain elevators, 19; total capacity, 531,000 bushels. Number creameries, 1. Number of lawyers, 10. Number of physicians, 6.

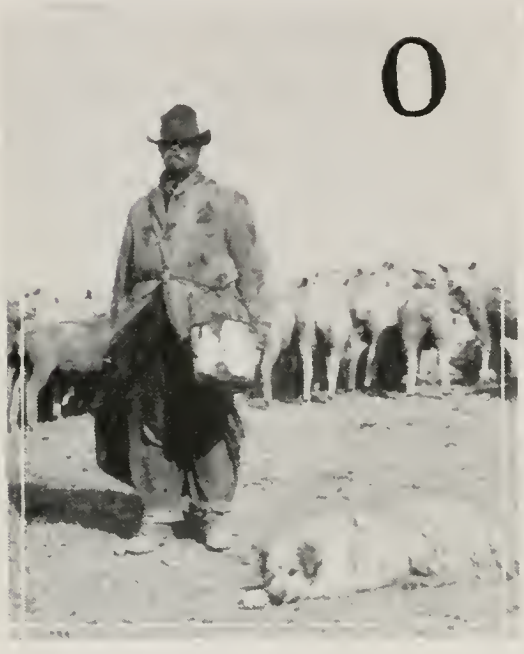
AGRICULTURE (1920 census)—No. farms, 1,060; farm acreage, 629,995; improved farm acreage, 266,150; irrigated acreage, 55,754; average value all property, per farm, $19,376. Livestock assessed 1922—number cattle, 12,510; number sheep, 13,110; number horses, 9,186; number swine (census), 1,908.

CLIMATOLOGICAL DATA—At Valier. Elevation, 3,825 feet. Average date last killing frost in spring, May 21; average date first killing frost in fall, September 28.

	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Aver. Prec.	.35	.22	.25	.67	1.61	2.18	1.65	1.43	1.63	.78	.21	.38	11.36
Aver. Temp.	17.5	20.4	28.1	42.5	49.8	58.7	64.8	63.9	53.6	43.1	33.1	21.9	41.4

County Seat, Conrad. Population County Seat, 988.
County Agricultural Agent—Yes.

LIBERTY COUNTY



ONE of the smallest counties in the state in area and population, Liberty county has been devoted almost wholly to stock raising and non-irrigated farming, but in recent months large gas flows have been found and the indications are considered promising for the bringing in of commercial oil wells. Piping of gas from the Liberty county field for household and industrial uses in Great Falls is projected.

It lies in north central Montana, about 20 miles wide east and west, and 55 miles long north and south, reaching to the International boundary line. Most of its surface consists of rolling prairie and bench lands, except in the northwestern quarter, where the Sweet Grass hills lie. The Marias River flows easterly through the southern part of the county, and the only other stream of consequence is Cottonwood Creek, which rises in the Sweet Grass hills and flows in a southerly direction until it empties into the Marias.

Thirty and forty years ago the region was all public range and a stock country. During the past fifteen years many settlers have come in and the range has disappeared.

Save for certain areas of unglaciated soils in the western part of the county, soil types are fairly uniform, ranging from sandy to clay and heavy clay loams. All of them require special care in handling to prevent soil blowing. Special tillage methods must be practiced to insure moisture conservation. The controlling factor of crop production is moisture. The one-crop sytsem of farming pravails and wheat is the principal crop. The most successful farmers are those who handle large acreages, 200 to 500 acres of crop each year, with a minimum of hired labor through the use of large team one-man outfits, and who, in addition, raise their livestock feed and family living. Sheep growing is the most important phase of the livestock industry.

Mining operations on a small scale have intermittently been carried on in the Sweet Grass hills and small quantities of gold, silver, lead and copper have been recovered. Coal and marble also are found in the county.

Much Natural Gas

The most notable mineral development was the discovery in 1923 of natural gas in large quantities. Considerable drilling for oil is being done.

The main line of the Great Northern crosses the county east and west and is paralleled by the Roosevelt highway. There is a direct highway from the south between Chester and Fort Benton.

Chester, the county seat, is the largest community and the principal trading point. Grain elevators are located at Chester, Joplin, Tiber and Lothair, on the railroad. There are a number of inland trading points.

The Sweet Grass hills and the region along the Marias were the locale of many thrilling scenes during the time of the fur-traders and in early territorial days.

LIBERTY COUNTY—Ranks fifty-third in population (2,416) forty-third in area (928,640 acres); fiftieth in combined 1922 crop and livestock value; forty-eighth in bank deposits, 1922; forty-eighth in assessed valuation, 1922. Acres public land, 20,760; acres state land, 88,415.

WEALTH PRODUCTION—Estimated 1922 crop value, $334,800; estimated livestock value, January, 1923, $495,800; total bank deposits, September 15, 1922, $282,154.

TAXATION 1922—Total assessed valuation, $10,525,465; total taxable value, $3,313,685. Total outstanding county bond indebtedness, $52,000; total outstanding county warrant indebtedness, $186,004; total outstanding school bond indebtedness, $81,048; other school debts, $397. Total general and special county taxes, $94,370; total general and district school taxes, $74,839; total municipal taxes, $3,951; total state taxes, $15,563; total tax (inclusive municipal), per capita, $78.11.

EDUCATIONAL—Number graded schools, 48; enrollment, 544. Number high schools, 3; enrollment, 93.

BUSINESS STATISTICS—Number of railroads, 1; railway mileage, exclusive spurs and sidetracks, 26.08. Number of manufactures, 3; average number wage earners, 1; value of products, $14,110. Number of banks, 2. Number general stores, 7; confectionery, etc., 3; groceries and meats, 4; lumber yards, 1; total number merchants, 49. Total assessed valuation 1922 merchandise, $147,617. Number grain elevators, 11; total capacity, 299,000 bushels. Number of lawyers, 1. Number of physicians, 2.

AGRICULTURE (1920 census)—Number farms, 517; farm acreage, 310,742; improved farm acreage, 99,225; irrigated acreage, 800; average value all property, per farm, $14,675. Livestock assessed 1922—number cattle, 4,814; number sheep, 6,387; number horses, 4,194; number swine (census), 399.

CLIMATOLOGICAL DATA—At Chester. Elevation, 3,132 feet. Average date last killing frost in spring, May 25; average date first killing frost in fall, September 7.

	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Ave. Prec.	.60	.26	.34	.47	1.60	2.77	1.02	1.18	1.30	.30	.32	.34	10.50
Ave. Temp.	9 7	12.8	25.9	41.8	51.9	59.3	66.5	64.0	53.4	44.9	30.4	18.3	39.9

County Seat, Chester. Population County Seat, 402.
County Agricultural Agent—No.

TOOLE COUNTY

THE discovery of petroleum March 14, 1922, in the Kevin-Sunburst field, changed the character and hopes of Toole county overnight. From a stock-raising and non-irrigated farming region it has been converted into an oil and gas region, the limits of which are as yet undetermined. It is an ambitious county, evidenced for one thing in the creation of an irrigation project designed to place 200,000 acres of land under the ditch. Much preliminary work has been done.

Toole county lies in north central Montana. It extends southward from the International boundary an average distance of 50 miles, and is about 40 miles wide, east and west. Save for the northeastern quarter, where the Sweet Grass Hills, an isolated mountain range, arise, topography is rolling prairie and bench lands. Soil types range from sandy and gravelly loams to heavier types of clay and heavy clay loams in the Marias River district in the southern part. The Marias is the only stream of any size. Willow Creek, in the eastern part, is the largest of several streams whose flow is intermittent.

The first settlement of any consequence in what is now Toole county was precipitated in the early eighties by the discovery of gold in the Sweet Grass Hills.

The mining excitement was short-lived. In 1887 a considerable area of the Blackfeet Indian reservation, which included most of Toole county, was thrown open to entry, and the big range cattle outfits moved in along the Marias and the streams near the Sweet Grass Hills. About 1910 the homesteading era began and nearly half the area of the county was filed upon. While the number of stock-raising outfits has declined, this industry is still dominant over agriculture, and indications are that a considerable area heretofore devoted to non-irrigated farming eventually will be used for grazing purposes. On the heavier types of soil, blowing sometimes causes trouble, and special tillage methods must be observed both to eliminate drifting and to conserve moisture, which is a limiting factor in crop production. Spring wheat is the principal crop, followed by oats and tame hay. In the eastern and southern districts acclimated varieties of corn do fairly well and provide forage for livestock. If the proposed irrigation project is carried to completion, agriculture will be markedly stimulated.

The Kevin-Sunburst oil field is the largest in area in the state, so far as present knowledge goes, and its production has been increasing rapidly. It lies in the western half of the county and is about 30 miles across, according to the U. S. Geological Survey. In September, 1923, outlying producing wells were 20 miles apart. A total of 85 producing oil wells and 20 gas wells were reported at that time. The settled production of the largest well was given as 2,000 barrels daily, but the settled production of most of the wells ran from 50 to 100 barrels daily. They range in depth from 1,500 to 1,800 feet. The estimated flow of the largest gas well was placed at 15,000,000 cubic feet of gas daily. This well was 2,570 feet in depth. The pipe line production of the field for the three months' period ending September 30, 1923, was 262,000 barrels. It is said that marketing conditions and lack of storage prevented a much larger output. Drilling operations are being expanded to new areas, to test out structures other than the Kevin-Sunburst. Coal is found in some districts.

Many machinery and supply houses, foundries and iron working shops have been established in the county since oil was discovered. Several pipe lines have been laid, including one to the Canadian border at Sweet Grass, and at Kevin a small refinery is operating. A larger one is projected at Shelby. The big flows of natural gas have not yet been commercially utilized, but arrangements to pipe it to Shelby for household and industrial uses have been completed, and a pipe line to Great Falls is projected.

Transportation facilities are good. The main line of the Great Northern crosses the county east and west. The Burlington-Great Northern line from the south connects with the main line at Shelby, and a branch line of the Great Northern runs north from Shelby to the Canadian border, where it connects with the Canadian Pacific. The Roosevelt highway follows the main line of the Great Northern, and the Montana-Alberta highway from Great Falls to Lethbridge parallels the railway north and south through the county.

Shelby, the county seat, is the largest town, the headquarters for the oil industry and the principal distributing point for a large region. It has experienced a phenomenal growth since oil was found. Sweet Grass, on the border, is a port of entry. Kevin and Sunburst are the chief towns in the oil fields.

TOOLE COUNTY—Ranks forty-seventh in population (3,724); thirty-third in area (1,253,120 acres); forty-seventh in combined 1922 crop and livestock value; twenty-sixth in 1920 mineral production; thirty-third in bank deposits, 1922; thirty-seventh in assessed valuation, 1922. Acres public land, 30,954; acres state land, 100,040.

WEALTH PRODUCTION—Estimated 1922 crop value, $165,500; estimated livestock value, January, 1923, $976,500; metal production, 1920, $1,076; coal production, 1920, $7,992; total bank deposits, September 15, 1922, $994,006.

TAXATION 1922—Total assessed valuation, $17,138,369; total taxable value, $5,564,953. Total outstanding county bond indebtedness, $654,000; total outstanding county warrant indebtedness, $30,769; total outstanding school bond indebtedness,

$127,922; other school debts, $13,045. Total general and special county taxes, $130,297; total general and district school taxes, $113,057; total municipal taxes, $27,587; total state taxes, $26,190; total tax (inclusive municipal), per capita, $79.78.

EDUCATIONAL—Number graded schools, 62; enrollment, 780. Number high schools, 2; enrollment, 64.

BUSINESS STATISTICS—Number of railroads, 1; railway mileage, exclusive spurs and sidetracks, 93.40. Number of manufactures, 5; average number wage earners, 3; value of products, $25,912. Number of banks, 8. Number general stores, 20; confectionery, etc., 5; groceries and meats, 6; lumber yards, 6; total number merchants, 111. Total assessed valuation 1922 merchandise, $142,181. Number grain elevators, 15; total capacity, 271,000 bushels. Number of lawyers, 7. Number of physicians, 7.

AGRICULTURE (1920 census)—Number farms, 933; farm acreage, 570,163; improved farm acreage, 153,852; irrigated acreage, 839; average value all property, per farm, $14,117. Livestock assessed 1922—number cattle, 5,637; number sheep, 26,987; number horses, 5,918; number swine (census), 815.

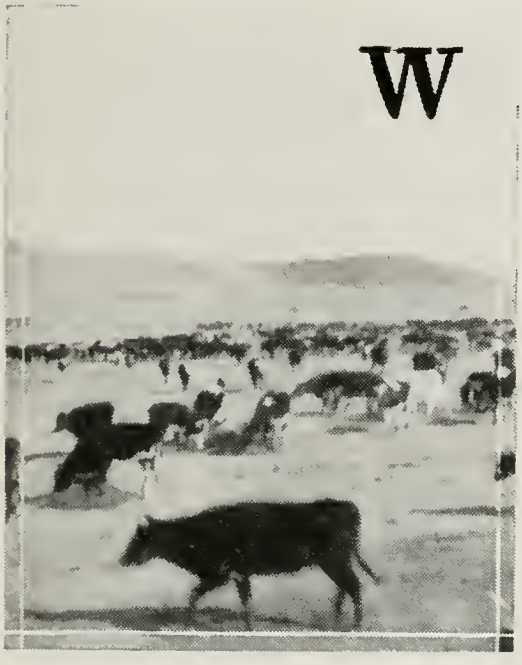
CLIMATOLOGICAL DATA—At Shelby. Elevation, 3,276 feet. Average date last killing frost in spring, May 27; average date first killing frost in fall, September 14.

	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Ave. Prec.	.38	.36	.30	.71	1.76	2.07	1.28	1.43	1.57	.79	.21	.37	11.23
Ave. Temp.	15.1	14.9	26.9	42.1	50.5	60.4	66.6	65.2	53.8	42.7	30.2	18.8	40.6

County Seat, Shelby. Population County Seat, 537.

County Agricultural Agent—No.

GLACIER COUNTY



WHILE stock raising is now and probably always will continue to be the leading agricultural pursuit, Glacier county, in north central Montana, through potential industrial resources, may experience development along other lines. It has an immense deposit of iron ore, bitmuinous coal measures, and several potential oil domes on which exploratory work has been projected. More than two-thirds the area of the county is within the Blackfeet Indian reservation, and a sixth of it is included within the Glacier National Park. There are large areas of idle irrigated land in the county which belong to the Indians but can be leased or purchased at low prices. In this county, according to the National Park Service, is found "the noblest mountain country in America."

Glacier county lies in north central Montana, the Canadian line defining its northern, and the crest of the main range of the Rocky Mountains its western boundary. Precipitous mountains occupy the western end and give way to plains sloping to the eastward, which are comparatively high in altitude. The region is well watered and the northern part, which is one of the best grass regions in the state, is ideally adapted to stock raising. The southern part of the county contains more level land and some good soil and also has a longer growing season than the northern part.

Drainage Into Three Oceans

This is the only county in the United States which has drainage into three oceans. The waters from Triple Peak, in the Glacier Park, flow into the Arctic, the Pacific and the Atlantic oceans, but most of the streams are tributaries of the Milk River which, through the Missouri, finally empties into the Gulf of Mexico.

While good forage and grain crops have been raised on the irrigated lands in the southern part of the county, and there is some non-irrigated farming in the eastern part, most of the lands are devoted to stock raising. A considerable area of the Indian tribal lands are set aside for leasing. While they

are principally used at present by large stock outfits, it is expected that eventually when the irrigated lands are settled, farmers occupying them will do mixed farming, raising feed on their own places for the winter months and leasing tribal lands for summer grazing. Spring wheat is the primary cash crop of the non-irrigated district, with oats, barley and rye yielding good average returns. Under non-irrigated methods, moisture is a controlling factor in crop production and special tillage methods must be followed. Special methods are also required in some sections for the prevention of soil blowing.

Big Iron Deposits

Coal has been found in the county, but there has been no commercial development aside from home use. Magnetite beds which can be traced for many miles entirely across the reservation, are found in the western part of the county. The high titanium content renders the ores unfit for use under present metallurgical practice, but the U. S. Geological Survey says such ores may eventually be successfully smelted. Large areas in certain parts of the county have been leased for oil drilling purposes. The Lewis and Clark National Forest occupies 25,000 acres in the southwestern corner of the county.

The main line of the Great Northern runs through the middle of the county east and west. A new state highway, north and south, connects at Browning with the Roosevelt Memorial highway and with the roads on the eastern side of the Glacier Park. The highway is being extended through the county from Babb to the Canadian line, where it connects with a main road to the Canadian Parks. The federal government is building a trans-mountain highway across the Rocky Mountains in this and Flathead counties that will be one of the most scenic roads in the country.

Cut Bank, the county seat, in the east end of the county, and Browning, the headquarters of the Indian Agency, are the principal towns. Cut Bank is a Great Northern division point. Both are modern and up to date in all respects.

Hunting and fishing, Indian tribal life, and the superb scenery in the Glacier Park each attracts and holds visitors.

GLACIER COUNTY—Ranks forty-fourth in population (4,178); forty-sixth in area (1,907,840 acres); forty-fourth in combined 1922 crop and livestock value; fifty-first in bank deposits, 1922; forty-ninth in assessed valuation, 1922. Acres public land, 2,563; acres state land, 12,645; acres national forests, 25,239; acres Indian (partially patented) and other reservations, 1,582,400 acres.

WEALTH PRODUCTION—Estimated 1922 crop value, $458,000; estimated livestock value, January, 1923, $1,274,700; total bank deposits, September 15, 1922, $189,377.

TAXATION 1922—Total assessed valuation, $10,317,567; total taxable value, $3,521,058. Total outstanding county bond indebtedness, $292,000; total outstanding county warrant indebtedness, $14,599; total outstanding school bond indebtedness, $187,485; other school debts, $43,485. Total general and special county taxes, $96,751; total general and district school taxes, $92,123; total municipal taxes, $40,425; total state taxes, $17,136; total tax (inclusive municipal), per capita, $58.98.

EDUCATIONAL—Number graded schools, 22; enrollment, 712. Number high schools, 2; enrollment, 91.

BUSINESS STATISTICS—Number of railroads, 1; railway mileage, exclusive spurs and sidetracks, 67.69. Number of manufactures, 4; average number wage earners, 2; value of products, $29,882. Number of banks, 2. Number general stores, 11; confectionery, etc., 2; groceries and meats, 7; lumber yards, 4; total number merchants, 84. Total assessed valuation 1922 merchandise, $211,953. Number grain elevators, 5; total capacity, 135,000 bushels. Number of lawyers, 11. Number of physicians, 2. Developed hydro-electric plant capacity, 60 horse power.

AGRICULTURE (1920 census)—Number farms, 372; farm acreage, 545,256; improved farm acreage, 168,338; irrigated acreage, 9,767; average value all property, per farm, $22,154. Livestock assessed 1922—number cattle, 19,062; number sheep, 22,687; number horses, 5,859; number swine (census), 136.

CLIMATOLOGICAL DATA—At Browning. Elevation, 4,366 feet. Average date last killing frost in spring, June 16; average date first killing frost in fall, September 2.

	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Ave. Prec.	.75	.60	.61	.85	1.69	2.11	1.11	1.13	1.90	.52	.47	.45	12.19
Ave. Temp.	16.3	18.7	27.6	39.7	46.9	56.2	61.7	60.0	51.4	41.5	29.7	20.9	39.2

County Seat, Cut Bank. Population County Seat, 1,181.
County Agricultural Agent—No.

NORTH WESTERN MONTANA

Produces More Than Half the Lumber Cut of the State—In Undeveloped Horse Power Ranks First—Region Ideally Adapted to Dairying and Diversified Farming.

Lying on the Pacific slope side of the Rocky Mountains, and enjoying a climate that is tempered by its location, the North Western district is a region of possibilities in tourist attractions, diversified farming and electrical energy. In it are included Flathead, Lincoln, Lake and Sanders counties, and also the western half of the Glacier National Park. Though mountainous, many broad and fertile valleys are found, and in Lincoln county is found the lowest elevation above sea level in the state.

Lumbering is the principal industry, more than half the annual cut of the state being produced here. Considerable fruit is raised. Diversified farming is advancing with dairying as one of the major activities. Both non-irrigated and irrigated farming are followed. The largest body of irrigated land is in Flathead and Lake counties. In every county, however, irrigated lands are awaiting development. In Flathead, Lincoln and Sanders counties there are also large tracts of cut-over lands, which, when cleared, are adapted to agricultural purposes.

Some mining is done in the western part, and large deposits of good coal are reported in Flathead county, but the principal industrial resource is water power. In developed water power the district ranks second, but in undeveloped, first. This region is becoming one of summer homes.

Elevations range from 1,800 feet above sea level to 3,000 feet in the tillable areas. The growing season ranges from three months to five months, lacking two days.

FLATHEAD COUNTY

A REGION of fertile valleys, wooded mountains, rapid streams and attractive scenery, Flathead county, in northwestern Montana, one of the most important lumbering districts in the state, is making marked progress along the lines of diversified farming and dairying, and each season is attracting a larger number of tourists. While most of the tourists come to see the Glacier National Park, many permanent summer homes have been built on Flathead and Swan Lakes by people from other regions who have been captivated by the scenery and the climate. The county runs north to the Canadian boundary and east to the Continental divide. The northern and eastern districts are mostly mountainous and 577 square miles in the northeastern part of the county are included in Glacier National Park. More than half the total area of the county is included within national forests, and 30,000 acres in the southwestern part are in the Flathead Indian reservation.

The agricultural areas are around Flathead Lake, north to Whitefish and Columbia Falls and in the southwestern portion. The extensive lumber industry has afforded a ready market for surplus feed crops of both hay and grain. In the earlier days of settlement most farmers raised hay exclusively to provide feed for the logging camps. Stock raising was also prominent. There has been a gradual change to a more diversified system that includes fruit growing, small small grain production and dairying. Dairying is becoming an important part of the diversified system and along with it the hog and poultry business is expanding. Interest in dairying is shown by the launching in 1923 of a cow-testing association, starting with 23 herds. It is the second association of the kind in the state. In 1922 Flathead was the biggest grower of potatoes of any county in the state. Both winter and spring wheat are grown, the latter predominating. Both irrigated and non-irrigated types of farming are followed. Many of the non-irrigated lands along rivers and lakes are sub-irrigated. On the higher non-irrigated areas, alternate cropping is generally practiced. The growing season is long, making it possible to grow corn, if not for grain, at least for a good feed crop, every year.

In fruit raising, Flathead county is second in importance. Bordering on Flathead Lake are many orchards of apples, pears, cherries, plums and berries. This region is particularly adapted to the sweet cherry, and the production is increasing.

There is considerable stump land in the county, which, when cleared, makes productive farms. The usual practice is to clear a few acres a year, seeding it to clover and timothy, for winter forage for dairy cows. Good summer range is available on the national forests, which heretofore has not been utilized by residents to its capacity. It is estimated there are approximately 100,000 acres of irrigable land in the county besides that now irrigated.

Coal, Water Power and Wood Pulp

While timber is the county's biggest natural resource, considerable coal is reported in the valley of the North Fork River north of Columbia Falls, but the field has not been developed. Besides 1,600 developed horse power, it is estimated an additional 12,000 horse power can be developed on the Flathead River below the South Fork. It is asserted that on the National Forests in this region there is a fine opening for a pulp and paper mill, with 1,750 million board feet of desirable wood pulp species available. Other resources include pottery clay, brick clay, fire clay and building stone. The existence of copper and other minerals is reported.

Lumbering is the most important industry. Before Lake county was created, there were 27 saw mills and several planing and box mills in the county. Among other plants are flour mills, creameries, a furniture factory, a foundry, and a harness and saddlery establishment.

The Great Northern main line crosses the county east and west, and a branch runs southwesterly from Columbia Falls through Kalispell to Somers, which is the head of navigation on Flathead Lake. The Theodore Roosevelt east and west highway crosses the county and the western route highway between Glacier and Yellowstone Parks runs north through the county. Magnificent drives around Flathead Lake, to Swan Lake and in the National Forests are afforded. Scenically, this is one of the most attractive regions in the country.

Kalispell, the county seat, is the largest city in northwestern Montana, is up to date, and an important wholesale and distributing center for a large region.

Whitefish, near the geographical center of the county, is a division point on the Great Northern. It is surrounded by a large area of cut-over lands which

are gradually being developed. There is a good farming region adjacent to Columbia Falls. Belton is the western entrance to Glacier Park.

*FLATHEAD COUNTY—Ranks seventh in population (17,747); fourth in area (3,300,122 acres); twenty-eighth in combined 1922 crop and livestock value; tenth in bank deposits, 1922; eighth in assessed valuation, 1922. Acres public land, 22,183; acres state land, 171,926; acres national forests, 1,877,385; acres Indian (partially allotted) and other reservations, 651,443.

WEALTH PRODUCTION—Estimated 1922 crop value, $1,462,800; estimated livestock value, January, 1923, $1,649,000; 1921 lumber cut, 57,027 M feet; total bank deposits, September 15, 1922, $4,268,961.

TAXATION 1922—Total assessed valuation, $46,406,543; total taxable value, $14,522,255. Total outstanding county bond indebtedness, $826,375; total outstanding county warrant indebtedness, $139,157; total outstanding school bond indebtedness, $271,792; other school debts, $600. Total general and special county taxes, $313,202; total general and district school taxes, $334,523; total municipal taxes, $79,332; total state taxes, $67,800; total tax (inclusive municipal), per capita, $36.62.

EDUCATIONAL—Number graded schools, 86; enrollment, 4,001. Number high schools, 6; enrollment, 1,017. Other institutions, State Soldiers' Home at Columbia Falls.

BUSINESS STATISTICS—Number of railroads, 2; railway mileage, exclusive of spurs and sidetracks, 156.58. Number of manufactures, 64; average number wage earners, 1,248; value of products, $4,286,317. Number of banks, 11. Number general stores, 32; confectionery, etc., 13; groceries and meats, 44; lumber yards, 22; total number merchants, 373. Total assessed valuation, 1922, merchandise, $1,916,145. Number grain elevators, 8; total capacity, 560,000 bus. Number creameries, 2. Number flour mills, 4. Number saw mills, 27. Number of lawyers, 32. Number of physicians, 27. Developed hydro-electric plant capacity, 2,820 horse power.

AGRICULTURE (1920 census)—Number farms, 1,923; farm acreage, 470,283; improved farm acreage, 179,201; irrigated acreage, 11,244; average value all property per farm, $11,302. Livestock assessed 1922—number cattle, 14,053; number sheep, 4,651; number horses, 7,228; number swine (census), 4,386.

CLIMATOLOGICAL DATA—At Kalispell. Elevation, 2,965. Average date last killing frost in spring, May 5; average date first killing frost in fall, October 2.

	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Ave. Prec.	1.34	1.05	1.06	.82	1.71	1.98	1.15	1.01	1.47	.94	1.54	1.14	15.21
Ave. Temp.	22.0	24.2	33.1	43.8	51.3	58.1	64.5	62.8	53.2	43.6	32.7	24.9	42.8

County seat, Kalispell. Population county seat, 5,147.
County Agricultural Agent—Yes.

*All the statistical information on Flathead County, except those for population and rank, area and rank, and acres of reservations other than national forests, are based on the boundaries of Flathead County before Lake County was created which took from Flathead County 1,224 square miles and from Missoula County 362 square miles.

LAKE COUNTY

IRRIGATED farms, beautiful scenery, considerable timber and not less than 300,000 undeveloped hydro-electric horse power are the principal assets of Lake county, which came into existence in August, 1923. Most of the area of the county is included within the boundaries of the former Flathead Indian reservation. The region was only opened to settlement in recent years and grain has been the chief crop, but rapid progress toward a more diversified system of farming is being made. Natural conditions make the region especially adapted to dairying. There is some lumbering but the chief industry is agriculture.

The county lies in west central Montana, on the Pacific slope side of the mountains. The average elevation of the tillable area is 3,000 feet. The crest of the Mission range defines the western boundary of the south half of the county. The northeastern part of the county, west of Flathead Lake, is rugged and mountainous, but most of the land west of Flathead Lake and most of the south

half, in the lower Flathead valley, is tillable. The soil varies from light sandy loam to heavy clay. Most of the land is undulating and for proper irrigation must be leveled. Numerous tributaries whose source is in the Mission range, empty into the Flathead River.

Diversified Farm Region

While considerable non-irrigated farming is being done, agricultural expansion will be most marked on the irrigable lands included within the Flathead government reclamation project, which is designed to reclaim 124,500 acres. Canals and laterals have been built to supply 105,000 acres of land. There are 2,000 farm units on the project and water deliveries are being made to 1,200 farms. The region is especially adapted to diversified farming and dairying. Alfalfa, clover and timothy are the principal forage crops. The acreage devoted to small grains is declining and that in forage, potatoes and other crops adapted to a diversified system is increasing. Bush fruits thrive. Most farms have home orchards of apples, pears, plums, or cherries. The best commercial orchards outside the Bitter Root are in Lake county. The interest in dairying is pronounced. The lands bordering on Flathead Lake are particularly adapted to the sweet cherry and the region is gaining a wide reputation on this product. Agriculture in Lake county is still in the first stages of development, the reservation lands not being opened to settlement until 1910.

The biggest industrial resource of the county is undeveloped hydro-electric power on the Flathead River which is variously estimated at 300,000 to 500,000 horse power. The federal power commission has under consideration several requests for permission to develop this power. Considerable timber is in the county. The Flathead Indians are the owners of 1,500,000,000 feet of uncut timber. A number of saw mills are operating in the county. The annual production of a creamery at Polson is steadily increasing. There is a flour mill at the same place with a capacity of 200 barrels daily.

Rail and Boats

A branch line of the Northern Pacific, which leaves the main line at Dixon, on the southern border of the county, runs north through the heart of the south half of the county to Polson, a distance of 51 miles. The Flathead Lake region is served by boats which connect with the Great Northern at Somers and with the Northern Pacific at Polson. A splendid automobile driveway encircles the lake, which is 35 miles long with a maximum width of about 18 miles. The western Park-to-Park route from West Yellowstone to Belton traverses the county north and south.

Polson, the county seat, scenically situated at the foot of Flathead Lake, near the geographical center of the county, is the largest town with all modern municipal improvements. Growing towns in the irrigated district are St. Ignatius, Ronan, Charlo and Pablo. Dayton, Big Arm and Rollins are lake communities.

Some of the most beautiful scenery in the west is found in this county. The Flathead valley, rimmed on the west by the staccato skyline of the Mission range, is strikingly attractive. The beauty of the Swan River region in the northwestern part of the county has lured a considerable number of folk from Montana and eastern cities to erect beautiful summer homes there. The shores of Flathead Lake are dotted with summer homes. Excellent fishing and big game hunting are to be enjoyed in the county. Eighty per cent of the 2,628 allottees of the former Flathead Indian reservation reside in Lake county and a total of 284,000 acres of land have been allotted them. Patents in fee simple have been issued to about 735 Indians. A considerable acreage of Indian lands can be purchased.

Statistics on taxation, education, business and timber, livestock and agricultural production for this county are not available. The statistics for Flathead

and Missoula counties in this publication cover areas out of which Lake county was created, except as to hydro-electric power (700 horse power are developed in Lake county), population and rank, area and rank, and acres of reservation other than national forests.

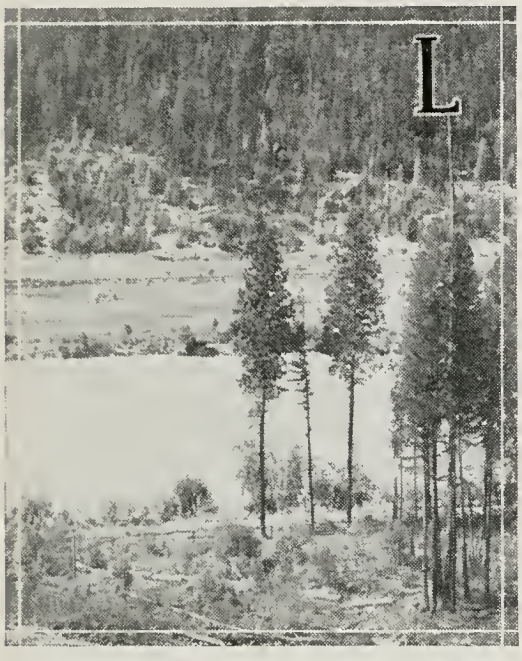
LAKE COUNTY—Ranks twenty-first in population (9,064); forty-second in area (1,015,140 acres); acres Indian reservations (partially allotted), 624,154 acres.

CLIMATOLOGICAL DATA At Polson. Elevation 2,919 feet. Average date last killing frost in spring, May 13; average date first killing frost in fall, September 28.

	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Ave. Prec.	1.14	.89	1.07	1.23	1.49	2.37	1.19	.89	1.52	1.16	1.42	1.29	15.66
Ave. Temp.	24.1	27.9	35.1	43.6	51.6	60.1	67.6	66.1	55.5	46.1	34.6	26.9	44.9

County Seat, Polson. Population County Seat, 1,132.
County Agricultural Agent—No.

LINCOLN COUNTY



LINCOLN county presents an anomaly. Notwithstanding that it is tucked away in the rugged mountains of far northwestern Montana, the lowest elevation above sea level in the state is found within its borders—an altitude of 1,800 feet along the Kootenai River, according to Bulletin 689 of the U. S. Geological Survey. The Canadian boundary marks its northern, and the Montana-Idaho line, its western borders. Lumbering and mining are its chief industires. Though its agricultural areas are limited in extent they are just being developed. Scenically, it is one of the most attractive counties in Montana and in fishing and hunting is unsurpassed. It is declared to be the best watered county in the state, its principal stream, the Kootenai, being credited with carrying a larger volume of water than does the Missouri. It has more than 100 mountain lakes and in nearly every gulch there is a brook fed from mountain springs.

The Tobacco River empties into the Kootenai in the northeastern part of the county, the Yaak river, flowing southerly through the county, joins the Kootenai near the western border, and the Fisher river in the southern end of the county discharges into it near Jennings, in the geographical center of the county.

The Agricultural Areas

The only considerable body of open land is the Tobacco Plains valley, near Eureka, in the northeastern part of the county, and more progress has been made here in farming than in other districts. The Kootenai valley is long but narrow. In places a series of benches lie between the river and the mountains, which, when cleared, will be tillable. There are also numerous small valleys all of which must be cleared for farming operations. In the Tobacco Plains valley soil types range from sandy loam to glacial loam and clay, and on the bench lands are chiefly glacial loam. In other districts a black loam is found in the valleys, a light red volcanic ash, frequently underlain with gravel, on the benches, while in places a gray loam occurs in both the valleys and on the benches. The elevation of the agricultural land ranges from 1,800 to 3,000 feet above sea level. Most of it consists of timbered or cut-over lands. There are 60,000 acres of open land in the Tobacco Plains valley. Both irrigated and non-irrigated farming is followed. The average annual precipitation is about 20 inches, which is more than

in most parts of the state. The region naturally adapts itself to diversified farming, with dairying probably as the major operation. Timothy and clover thrive, and splendid summer grazing is afforded on the national forests which embrace more than two-thirds the area of the county. While fruit raising has not been developed to a commercial magnitude, apples, plums, cherries and bush fruits do well in all parts of the county. In the western district pears and peaches are grown. Vegetables and root crops are produced in abundance.

Lumbering is the main industry, and some of the largest saw mills in the state are located at Libby, Eureka, Warland and Troy. A chemical plant, the only one of its kind in the world, for the manufacture of mucic and oxalic acid and a number of by-products, has been built and is in operation at Eureka. Butts and waste logs furnish the raw material, and the demand for the product has been so much in excess of the capacity that large additions are projected.

The mining districts are in the western part of the county, on the Yaak river, on Callahan Creek, south of Troy, and on Libby Creek, south of Libby, and on Fisher River in the southern part of the county. Bulletin 384 of the U. S. Geological Survey, deals with the Lincoln county district, among others, and pronounces it "a promising field for the prospector. In general, the reconnoissance has left a strong impression that systematic and widely-directed development might considerably increase the mineral production of northern Idaho and adjacent portions of Montana". The county has produced commercially gold, silver, copper, lead and zinc. The existence of mica is reported.

Promising Mining District

The undeveloped water power of the county is estimated at 31,000 horse power, exclusive of many small developments.

The main line of the Great Northern crosses the county east and west and a branch line runs from Rexford to the Fernie coal fields in British Columbia. The Theodore Roosevelt highway parallels the railroad and serves the northern part of the county. The Park-to-Park highway enters the county near the southwestern corner and, swinging northwesterly, meets the Roosevelt highway at Libby. The last stretch of the Roosevelt highway is now under construction and when completed late in the summer of 1924 will be one of the most scenic roads in the country. The Scenic International Parks Highway, from Salt Lake to Banff and the Canadian National Parks, enters the county from the eastern side and at Eureka swings north to Gateway into Canada.

Libby, in the west central part, and Eureka, in the northeastern corner, are the largest towns. Both have all modern improvements. Troy is the principal mining center. At Warland there is a large saw mill and adjacent to it are a number of small developed farms. Eureka business men organized the Tobacco Valley Development Association which in 1923 offered agricultural lands for sale on the amortization plan, being one of the first private concerns in the state to adopt this method. Through its efforts a colony of former service men was established in the valley.

Magnificent scenery, large forests, excellent fishing and big game hunting are features of the county's tourist attractions. The Kootenai National Forest is one of the wildest and least explored regions in the country.

LINCOLN COUNTY—Ranks twenty-sixth in population (7,797); twelfth in area (2,319,360 acres); fifty-third in combined 1922 crop and livestock value; tenth in 1920 mineral production; thirty-seventh in bank deposits, 1922; twenty-eighth in assessed valuation, 1922. Acres public land, 6,310; acres state land, 57,265; acres national forests, 1,673,983.

WEALTH PRODUCTION—Estimated 1922 crop value, $208,900; estimated livestock value, January, 1923, $264,600; metal production, 1920, $429,624; 1921 lumber cut, 45,406 M feet; total bank deposits, September 15, 1922, $858,305.

TAXATION 1922—Total assessed valuation, $20,349,082; total taxable value, $6,735,954. Total outstanding county bond indebtedness, $324,347; total outstanding

county warrant indebtedness, $1,817; total outstanding school bond indebtedness, $239,445; other school debts, $7,331. Total general and special county taxes, $161,265; total general and district school taxes, $188,447; total municipal taxes, $36,632; total state taxes, $31,415; total tax (inclusive municipal), per capita, $53.58.

EDUCATIONAL—Number graded schools, 36; enrollment, 1,381. Number high schools, 3; enrollment, 283.

BUSINESS STATISTICS—Number of railroads, 1; railway mileage exclusive spurs and sidetracks, 128.26. Number of manufactures, 22; average number wage earners, 1,008; value of products, $3,798,067. Number of banks, 4. Number general stores, 15; confectionery, etc., 3; groceries and meats, 12; lumber yards, 7; total number merchants, 124. Total assessed valuation 1922 merchandise, $955,315. Number saw mills, 14. Number of lawyers, 9. Number of physicians, 9. Developed hydro-electric plant capacity, 1,890 horse power.

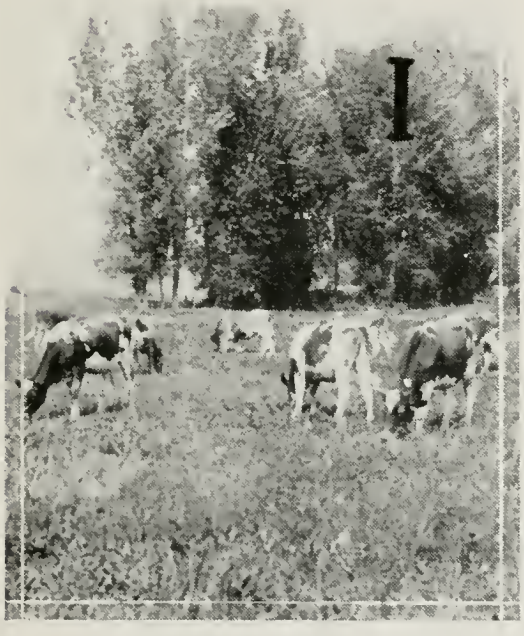
AGRICULTURE (1920 census)—Number farms, 341; farm acreage, 65,050; improved farm acreage, 16,894; irrigated acreage, 5,923; average value all property, per farm, $7,206. Livestock assessed 1922—number cattle, 2,937; number sheep, 76; number horses, 1,883; number swine (census), 782.

CLIMATOLOGICAL DATA—At Libby. Elevation, 2,075 feet. Average date last killing frost in spring, June 6; average date first killing frost in fall, September 6.

	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Ave. Prec.	2.61	1.7	1.68	1.09	1.53	1.64	1.17	.94	1.56	1.61	3.4	2.34	21.27
Ave. Temp.	23.4	27.9	35.9	46.0	53.1	59.3	64.9	63.4	55.0	45.4	33.9	25.8	44.5

County Seat, Libby. Population County Seat, 1,522.
County Agricultural Agent—No.

SANDERS COUNTY



N THE past, lumbering has been the leading industry but the development of Sanders county in the future will largely rest upon diversified farming with dairying as one of the major activities, and upon hydro-electric installations utilizing the water power now going to waste. In developed horse power, Sanders county ranks third, and in undeveloped power second.

Sanders lies in west central Montana, with a maximum length of about 110 miles from the southeast to the northwest. The Clark's Fork of the Columbia runs through the middle of the western two-thirds and the Flathead river, which empties into the Clark's Fork, through the eastern one-third of the county. The crest of the Coeur d'Alene Mountains defines the eastern and about half of the southern boundary and the crest of the Cabinet range marks the western third of its northern boundary. Nearly half of the county is included within national forests. The topography is mountainous, with narrow, fertile, intermountain valleys, of which the largest are the Clark's Fork, the Little Bitter Root and the Camas Prairie. The prevailing soil type on the bottom lands of the Clark's Fork is a deep sandy loam, and on the bench lands a gravelly loam. A white clay soil is found in the Little Bitter Root and Camas Prairie valleys, which, although slightly deficient in organic matter, grows fine alfalfa and other legumes, and is adapted to other crops following legumes. A considerable proportion of the agricultural lands is irrigable. While around 6,000 acres of irrigated land are in use, a total of approximately 33,000 acres will be irrigated by works under construction or completed. Most of this acreage is included within that portion of the Flathead Indian project lying in the Little Bitter Root and Camas Prairie valleys. Many small tracts along the Clark's Fork can be irrigated by pumping, and projects recently were completed for the reclamation of 2,000 acres near Noxon and of 3,000 acres near Weeksville.

While small grains, clover, fruit and alfalfa have been the chief crops, diversified farming combined with dairying has made marked progress in the last year or two. Many dairy cows have been shipped in co-operatively and the grains and legumes formerly sold are being utilized on the farms. Corn and sunflowers are grown for silage. The Little Bitter Root valley is the most important agricultural district. In addition to dairying, it is specializing on alfalfa and clover seed production and certified potato seed. In 1923 some acreage was contracted for growing seed peas. Interest is being taken in poultry raising and agriculture. Farming is well established in Sanders county and a type of agriculture well suited to the region is being evolved. Expansion of the industry involves some pioneering, in clearing the logged-off lands which can be irrigated from private projects and of leveling and developing units under the Flathead project of the Indian Service. Under present conditions, dairying would most likely be the major activity, particularly in the Little Bitter Root valley, which lies 30 miles from the railroad. Considerable grazing is afforded on the national forests.

Dairying Is Expanding

The biggest undeveloped industrial resource of the county is water power, of which 40,000 horse power has been developed at Thompson Falls, with sites available that will generate an additional 240,000 horse power. In the last few years there has been little mining activity in the county, but there are promising districts and properties in the west end of the county. Gold, silver, copper and lead have been produced commercially. The existence of antimony, brick clay and pottery clay is reported. The Thompson River country contains one of the finest bodies of virgin western yellow pine saw timber in the state, most of which is privately owned. The national forest timber in the county is estimated at approximately 900,000 M feet, chiefly yellow pine, larch, Douglas fir and western white pine.

The main line of the Northern Pacific and one of the main east and west highways follow the course of the Clark's Fork through the county. At Dixon, near the eastern border, a branch of the Northern Pacific runs northward to Polson, on Flathead Lake. A north and south highway, connecting Noxon, in the west end of the county, with Troy, on the Great Northern, will be open as soon as a six-mile stretch now under construction by the Forest Service is completed.

Thompson Falls, about midway east and west, is the county seat and the largest community. A feature of the school system is a new dormitory, costing $130,000, that was erected in 1922 as part of the equipment of the Thompson Falls High School, to furnish room and board to out-of-town pupils at $13 to $15 a month. Plains is a trade and shipping point for a large agricultural district. Perma and Dixon are shipping points in the east end, and Heron, Noxon, Trout Creek, Whitepine and Alger are trading points in the logged-off districts.

Excellent fishing is found in the numerous streams, and the Cabinet mountains, in the northwestern part of the county, offer good big game hunting in season. Hot Springs, 20 miles north of Perma, is a tourist and health resort, open the year 'round.

SANDERS COUNTY—Ranks thirty-eighth in population (4,903); nineteenth in area (1,831,040 acres); forty-ninth in combined 1922 crop and livestock value; thirtieth in 1920 mineral production; 40th in bank deposits, 1922; twenty-first in assessed valuation, 1922. Acres public land, 37,090; acres state land, 58,310; acres national forests, 822,157; acres Indian reservations (partially allotted), 456,672.

WEALTH PRODUCTION—Estimated 1922 crop value, $446,500; estimated livestock value, January, 1923, $598,500; metal production, 1920, $3,479; 1921 lumber cut, 7,388 M feet; total bank deposits, September 15, 1922, $722,797.

TAXATION 1922—Total assessed valuation, $22,572,053; total taxable value, $7,730,595. Total outstanding county bond indebtedness, $350,000; total outstanding county warrant indebtedness, $4,161; total outstanding school bond indebtedness, $255,295; other school debts, $839. Total general and special county taxes, $222,044; total general and district school taxes, $192,795; total municipal taxes, $5,404; total state taxes, $35,873; total tax (inclusive municipal), per capita, $93.02.

EDUCATIONAL—Number graded schools, 35; enrollment, 1,049. Number high schools, 7; enrollment, 252.

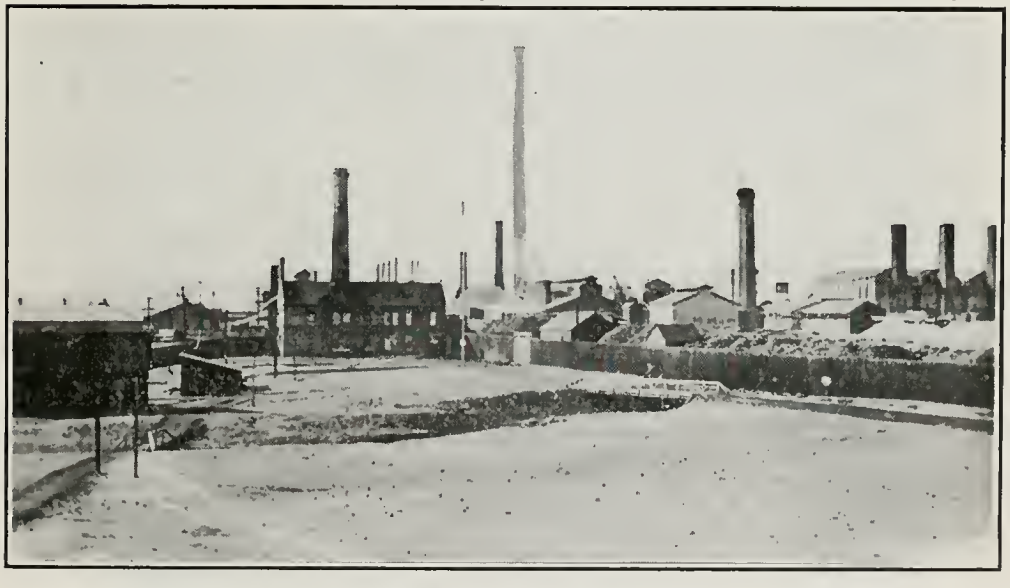
BUSINESS STATISTICS—Number of railroads, 1; railway mileage, exclusive spurs and sidetracks, 150.53. Number of manufactures, 22; average number wage earners, 192; value of products, $894,830. Number of banks, 6. Number general stores, 28; confectionery, etc., 2; groceries and meats, 2; lumber yards, 6; total number merchants, 109. Total assessed valuation 1922 merchandise, $285,108. Number grain elevators, 3; total capacity, 80,000 bushels. Number creameries, 1. Number flour mills, 1. Number saw mills, 12. Number of lawyers, 6. Number of physicians, 5. Developed hydro-electric plant capacity, 40,000 horse power.

AGRICULTURE (1920 census)—Number farms, 464; farm acreage, 106,522; improved farm acreage, 28,696; irrigated acreage, 6,373; average value all property, per farm, $9,999. Livestock assessed 1922—number cattle, 9,800; number sheep, 3,424; number horses, 3,046; number swine (census), 1,385.

CLIMATOLOGICAL DATA—At Plains. Elevation, 2,473 feet. Average date last killing frost in spring, May 30; average date first killing frost in fall, September 20.

	No. Yrs. Record	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Normal Prec.	....	1.12	.67	.57	.53	1.7	1.79	1.32	.96	1.42	.92	1.53	.60	13.13
Mean Temp.	23	25.1	28.2	36.8	45.4	52.0	59.0	66.3	64.8	55.5	46.0	35.1	27.0	45.1

County Seat, Thompson Falls. Population County Seat, 508.
County Agricultural Agent—Yes.



A Metallurgical Smelter

LIBRARY
University of Montana

APPENDIX*

Raw, Process, Energy and Fuel Materials Found in Montana

FUEL AND ENERGY RESOURCES

COAL

Uses—Industrial and household fuel, manufacturing gas, smithing. Distilled to form coke used in smelting ores of iron and other minerals. Present coking practice in United States yields to each short ton of coal—19 pounds sulphate ammonia, used in refrigeration, high explosives and nitrogenous fertilizer; 7.1 gallons tar from which are derived organic compounds used in chemicals and dyes and coal tar pitch used in surfacing roads, roofing and as binder for fuel briquets; 2.4 gallons crude light oil whose derivatives are the bases of certain high explosives; 10,500 cubic feet of gas and 1,425 pounds of coke. Bituminous, subbituminous and lignite coals are the principal kinds found in Montana.

Occurrence—According to report of U. S. G. S. and of the state coal mine inspector, has been commercially mined in Blaine, Carbon, Carter, Cascade, Choteau, Custer, Dawson, Fallon, Fergus, Hill, Missoula, McCone, Musselshell, Park, Pondera, Prairie, Richland, Roosevelt, Sheridan, Stillwater, Toole and Wibaux. Also occurs in Beaverhead, Big Horn, Broadwater, Daniels, Deer Lodge, Flathead, Gallatin, Garfield, Glacier, Golden Valley, Granite, Judith Basin, Lewis and Clark, Madison, Meagher, Phillips, Powder River, Powell, Ravalli, Rosebud, Sweet Grass, Teton, Treasure, Valley, Wheatland and Yellowstone. Coking coal, according to Rowe, is found in Broadwater, Cascade, Gallatin, Lewis and Clark, Meagher, Park and Sweet Grass. Steam and domestic coal, according to Rowe, is found in Carbon, Cascade, Wheatland, Sweet Grass, Gallatin, Rosebud, Yellowstone, Fergus, Judith Basin, Musselshell, Golden Valley, Lewis and Clark, Meagher and Park. Gas coal, according to Rowe, is found in Lewis and Clark and Meagher. Blacksmith coal, according to Rowe, is found in Cascade, Teton and Park. Semi-anthracite, according to Rowe, has been found in Madison and Park counties.

A plant was recently erected at Minot, North Dakota, for the production of a commercial weatherproof briquet from lignite, equal in fuel value to the best anthracite and at a slightly lower cost. Its operation, if successful, will mean much to eastern Montana in the commercial exploitation of its vast lignite beds.

Of tremendous economic importance to Montana is the announcement made by the United States Bureau of Mines, in 1923 of the successful development of an oven for the conversion of lignite coal into a fuel of practically the same thermal efficiency as the best Pennsylvania anthracite. The apparatus is pronounced "a practical, commercial oven, now past the experimental stage." Of the 1,051,290,000,000 tons of lignite coal in the United States, the United States Geological Survey reports 381,000,000,000 tons, or more than a third of the total, is found in Montana.

*No claim is made for this appendix of completeness. New resources are constantly being discovered, and there is every reason to believe that it will be many years before the resources of the state are fully tabulated. This appendix is based upon reports and bulletins of the United States Geological Survey, upon researches made and published by J. P. Rowe, professor of geology at the State University, and upon information obtained from firms and individuals and from other sources.

ELECTRICITY

Uses—Source of light, heat and power for industrial and household purposes. As a therapeutic agent. It is mankind's most recently developed form of energy and its field of usefulness in all the industrial and household arts is rapidly and constantly being expanded. It is the most flexible and cleanly form of energy to handle that mankind has found. Its widespread application, according to economists, has been the chief factor that has made possible the development of the large cities of this generation. Distances over which it can be transmitted are steadily being lengthened and the energy carried is constantly being increased. Rapid strides are being made in electro-metallurgy. More intense heat can be generated in the electric furnace than in any other furnace known to science and it is gradually supplanting other appliances in many fields. Incidentally, the largest electric furnaces in the world have been erected at Great Falls, in this state. Electrical energy is easily made available from units small enough to prepare the breakfast toast and coffee to units that surpass in effectiveness the world's largest locomotives in hauling long and heavily loaded freight trains over the mountainous backbone of the continent.

While all forms of energy can be converted into electricity, the current derived from water power, over a period of years, is said to be the most economical to generate. Montana possesses, according to the United States Geological Survey, approximately one-tenth of the potential hydro-electric power of the country. The potential minimum hydro-electric development on Montana streams is 2,749,000 horse power, or 9.84 per cent of the total potential minimum of the United States. The potential maximum hydro-electric development in Montana is placed by the Geological Survey at 4,331,000 horse power, or 8.03 per cent of the country's total potential maximum development. The developed capacity of Montana hydro-electric plants is placed at 420,000 horse power by the United States Geological Survey. The installed capacity, according to figures obtained from the Public Service Commission and the larger power companies, is 296,439 horse power. A number of the larger plants in the state have dams and storage capacity capable of delivering more power when additional turbines are installed. In 1922 Montana produced nearly seven per cent of the nation's electricity from water power and was the fourth ranking state, according to the Geological Survey. Of all the power used in Montana, 99.2 per cent is generated by water power. Montana uses more electricity per capita than any other state.

More than two-thirds of the present installed hydro-electric capacity of the state is on the Missouri River and its tributaries, in central Montana, but approximately three-fourths of the potential undeveloped capacity is in western Montana on the Pacific slope, on the Clark's Fork, the Flathead and Kootenai Rivers principally. The total potential development in Montana on the Missouri and its tributaries is estimated by the Geological Survey at 700,000 horse power.

Occurrence—The installed capacity of developed hydro-electric power in Montana, by counties, is as follows: Beaverhead, 4,777 h. p.; Cascade, 130,815 h. p.; Fergus, 1,050 h. p.; Flathead, 2,820 h. p.; Glacier, 60 h. p.; Granite, 2,340 h. p.; Lake, 700 h. p.; Lewis and Clark, 87,335 h. p.; Lincoln, 1,890 h. p.; Madison, 16,700 h. p.; Meagher, 75 h. p.; Mineral, 144 h. p.; Missoula, 3,200 h. p.; Park, 3,100 h. p.; Sanders, 40,000 h. p.; Yellowstone, 1,440 h. p.

The undeveloped water power in Montana on four of its principal watersheds, according to an article by E. W. Kramer, hydro-electric engineer of the United States Forest Service, in The Electrical World, July 16, 1921, is as follows:

MISSOURI AND MADISON

Name	Undeveloped H. P.
Madison	14,000
Madison	20,000
Madison	12,000
Madison	4,000
Madison	30,000
Cascade	17,000
Missouri	21,000
Sheep Creek	22,000
Total	140,000

YELLOWSTONE

Yankee Jim Canyon	5,000
Mystic Lake	8,000
Billings	1,560
Big Horn Canyon	100,000
Buffalo Rapids	5,000
Total	124,560

CLARK'S FORK

North Fork Flathead	30,000
Coram	12,000
Swan River	5,500
Polson	205,000
Lower Flathead	82,000
Thompson Falls	20,000
Donlan	48,000
Rock Island	60,000
Cabinet	92,000
Fish Creek	24,000
Total	578,500

KOOTENAI

Kootenai Falls	20,000
Leonis	11,000
Total	31,000
Grand Total	874,060

NATURAL GAS

Uses—An ideal domestic fuel and used especially as an industrial fuel in glass works, cement plants, brickyards, factories and metallurgic plants. Also used in making carbon black, a constituent of rubber tires, paints and inks. From some natural gas the gas helium, used as a non-inflammable substitute for hydrogen in balloons, is extracted.

Occurrence—On the Cedar Creek anticline in Fallon, Prairie and Dawson counties; in Elk Basin, Carbon county; near Havre, Hill county; in the Sweet Grass hills in northern Liberty county; near Shelby, Toole county; 35 miles southeast of Big Sandy, Choteau county; at Antelope Piont, Stillwater county; in northern Liberty county. Reported by U. S. G. S. in Cone Butte Dome, Fergus county. But little attention has thus far been given this resource Billings, Bridger, Fromberg and Laurel use the gas from Elk Basin for light and

fuel; Glendive and Baker from the Cedar Creek anticline, and Havre from the Hill county field. The gas from the Toole county field is being used in Shelby. An investigation is under way with a view of extending its use, with that of the northern Liberty county field, to Great Falls. Plans are also being considered to extend the use of the gas from the Cedar Creek anticline to a number of other eastern Montana towns besides Glendive and Baker. There is one carbon black plant near Baker, Fallon county, where 11 to 12 wells have been brought in. On Cabin Creek, 20 miles north of Baker, there are three gas wells, two of which are of considerable size. In 1921 Montana produced, according to the U. S. G. S. 336,000 M cubic feet of gas with a value at point of consumption of $89,300. In the past few months many new gas wells have been brought in, with a reported production ranging from one million to thirty-five million feet of gas per well a day. The Cedar Creek anti-cline is said to be one of the largest gas fields in the United States. The Toole county field is reported to have available from twenty-five to thirty million feet of gas a day that runs over 90 per cent methane. The estimated flow of one well in the northern Liberty county field, which is the most recent to be discovered, is thirty-five million cubic feet a day. Natural gas was discovered in Montana as far back as 1892.

PETROLEUM

Uses—Source of power, light and lubricants. Derivatives include local anesthetics, constituents of surgical dressings, ink, soap, rubber tires, paints, cosmetics, emulsions and many other articles. Petroleum coke, an almost pure carbon, used in metallurgy and in making battery carbons and arc light pencils. Nearly two hundred products are manufactured from this mineral, adapted to a wide variety of uses.

Occurrence—In Carbon, Musselshell, Fergus, Garfield, Big Horn and Toole counties. Also has been reported found, only in small quantities, however, up to the present time in Choteau, Stillwater and Fallon counties. Commercially produced in Fergus, Toole and Carbon counties. Drilling for oil is being done in about thirty-five counties of Montana at present. There are ten refineries in the state, two at Lewistown, one at Hedgesville and one at Winnett, all in Fergus county; one at Billings, Yellowstone county; one at Miles City, Custer county; one at Roundup, Musselshell county; two at Great Falls, Cascade county; one at Kevin, Toole county. Production of oil began in Montana in 1916 with 44,917 barrels; in 1922 the state's production was approximately 2,230,000 barrels. In January, 1923, there were approximately 144 producing wells in the state; six months later there were approximately 200 producing wells. (See also oil shale.)

PRECIOUS GEMS AND METALS

GEMS AND PRECIOUS STONES

Uses—In jewelry and articles of adornment.

Occurrence—Sapphire deposits on Yogo Creek, 25 miles southwest of Hobson, Judith Basin county, claimed to be the most valuable in the world. The beds occur in a matrix which has been opened for a distance of six miles. The output is shipped to London; most of the cutting is done in Switzerland. There are three other extensive sapphire deposits in the state, on Rock Creek, Granite county; along Dry Cottonwood Creek, Deer Lodge County; and along the Missouri River for 20 miles near Helena, Lewis and Clark county. These three beds are gravel deposits, but only one—Rock Creek beds—are being worked, and practically the entire output goes for industrial uses. Among other counties where finds of sapphires have been reported are Musselshell and Powder River.

Other gems and stones: Octahedral diamond, reported found near Blackfoot,

Deer Lodge county. Moss agate and mocha stones of fine quality found from the Dakota line west up the Yellowstone valley into the Yellowstone Park, from the size of a hazelnut to pieces weighing twelve pounds and bringing prices ranging from $1 to $200. Cut, the stones are used in brooches, stickpins, belt buckles, watch fobs, etc. Black tourmaline in Jefferson county. Yellow and smoky topaz in Park and Madison counties. Rhodonite in Silver Bow county. Jasper in Dawson county. Azurmalachite in Silver Bow and Broadwater counties. Garnets are found in many districts.

GOLD

Uses—In coins and jewelry, in the form of fine bars as medium of international exchange, in dental work, in plated wire.

Occurrence—Has been commercially produced in Beaverhead, Broadwater, Cascade, Deer Lodge, Fergus, Gallatin, Jefferson, Granite, Lewis and Clark, Lincoln, Madison, Meagher, Mineral, Missoula, Park, Phillips, Powell, Ravalli, Sanders and Silver Bow counties.

PLATINUM

Uses—In manufacture of chemical apparatus, in electrical industry, in jewelry and dental work. Almost indispensable in manufacture of certain acids and chemicals and in apparatus for measuring high temperatures. Compounds used in photography. Two-thirds of the platinum used in this country goes into jewelry.

Occurrence—Reported assay from mine in Frog Pond district, Granite county, showed $34 in platinum among other values, and assay from another mine in same district showed $42 in platinum, among other values; also found, among other values, in ores from the Fleming mine, near Alhambra, Jefferson county; also reported to occur in the sands of Upper Boulder Creek, near Contact, Park county; also reported to occur in the sands of Harris Gulch, near Alder, in Madison county.

SILVER

Uses—In coins and jewelry, in the form of fine bars as medium of international exchange, in plated ware and chemicals, and in form of silver nitrate for photographic films.

Occurrence—Has been commercially produced in Beaverhead, Broadwater, Cascade, Deer Lodge, Fergus, Gallatin, Jefferson, Granite, Lewis and Clark, Lincoln, Madison, Meagher, Mineral, Missoula, Park, Phillips, Powell, Ravalli, Sanders and Silver Bow counties. It is largely due to the big production of silver in Silver Bow county that Montana in recent years has ranked first among the states as a silver producer.

MINERALS—METALLIC

ALUMINUM

Uses—In household utensils, instruments, parts of internal combustion engines and many other articles in which lightness or resistance to oxidation, or both, are essential. Bauxite, the most important ore of aluminum also used for making artificial abrasives by fusing it in the electric furnace, for producing aluminum salts, and for making refractory brick for furnace lining.

Occurrence—Reported on Sweeney Creek, west of Florence, Ravalli county.

ANTIMONY

Uses—Principally for making alloys with other metals, oxides in enamels and pigments, sulphides in pigments, vulcanizing rubber and safety matches. In war used for hardening bullets, in shell primers and in powder designed to produce dense smoke or explosion.

Occurrence—Reported in Sanders county, on Prospect Creek, in blanket beds, some of which are three feet thick. Also contained in the grey copper ores of the Butte ditsrict which run about 25 per cent antimony. This is not being recovered as a by-product. U. S. G. S. says antimony deposits in this state have been worked only during high prices.

BISMUTH

Uses—In metallic form for making low-fusing alloys or cliche metals which are used in automatic fire sprinklers, fuses for electric wiring, and solders. Some of the salts have a smooth unctuous feel, and are used in face and toilet powders and in medicinal preparations. Also employed to a small extent in making optical glasses.

Occurrence—With the copper ores of the Butte district which tests made in 1911 showed carried 20 pounds bismuth to the ton. Investigator reported not worth saving at $35 a ton, but U. S. G. S. confident process will be evolved for isolating bismuth from flue dust as rich as that derived from Butte ores.

CADMIUM

Uses—Chiefly used as an alloy in materials requiring low melting points, such as sprinkler system heads, automatic releases on fire doors, also as alloy in cliche metal for stereotype plates, in silver plating and dental amalgam. In recent experiments used to replace tin in solders and in bronzes, which would open a wide field to it. Reported to be a better rust preventive than nickel.

Occurrence—Recovered as a by-product of the zinc ores from Butte district in a ratio of one part to 500 parts of zinc at the electrolytic zinc plant of the A. C. M. Co. in Great Falls. Precipitated electrolytically on aluminum plates, the product being 99.97 per cent pure.

CHROMITE

Uses—It is the chief ore of the metal chromium which is smelted in the electric furnace to produce the alloy of iron and chromium called ferrochrome, used in making chrome steel, another alloy, remarkable for its hardness. Fuses or melts only at a very high temperature and used as refractory material for lining furnaces. Chemical compounds of chromium are used in making pigments, dyes and mordants in oxidizing, bleaching and tanning.

Occurrence—Two deposits of chromite are reported in Montana by the U. S. G. S., one, 10 miles southwest of Red Lodge, between Rock Creek and West Fork of Rock Creek (Carbon county), and the other in Stillwater and Sweet Grass counties. This latter deposit starts on Boulder River in Sweet Grass county, 10 miles south of McLeod, and extends in a general direction south of east for 27 miles, to Fishtail Creek, in Stillwater county. It is not only one of the largest deposits in the United States, but the U. S. G. S. says, "the form of occurrence of the chromite in this belt is radically different from that of deposits farther west, in California and Oregon, and that there is much stronger reason for counting on continuity in depth here than there".

Estimates of the available tonnage have been made for only 19,000 feet in a total length of 27 miles. This estimate is 350,000 tons to a depth of 100 feet, but the U. S. G. S. says without doubt the ore goes beyond that depth to a considerable distance, possibly 1,000 feet. Seven samples returned assays averaging 36.5 per cent of chromic oxide with an iron content of 16 to 19 per cent. The assays were taken in the main, or high grade ore body which averages 12 inches to two feet thick. The mixed ore, which averages four feet in width, assays 5 to 25 per cent chromic oxide. Concentrating tests, it is reported, show the mixed ore will concentrate to a 39.8 per cent chromic oxide ore with a 53 per cent saving of the chromite. The assays made of this chromite ore indicate it

will suit the requirements of steel manufacturers. In making a ferrochrome containing six per cent of carbon it is necessary to use a chrome ore containing at least twice as much chromium as iron in order to produce a ferrochrome containing 60 per cent of chromium.

Robert M. Keeney of the Bureau of Mines is quoted to the effect that "ferrochrome can be easily manufactured directly from chromite in the electric furnace". The U. S. G. S. says: "The metallurgy of chromite has apparently been so developed in the hydro-electric process as to utilize to advantage relatively low grade ores such as are most abundant in the United States, and the further development of that process on the Pacific coast, where water power abounds, would greatly diminish the handicap of long transportation".

In 1919, 61,404 long tons of chromite were imported into the United States.

COPPER

Uses—The first metal used by man and is today second only to iron in its industrial value. Has become indispensable only since the electrical industry was established. Most of the copper produced is now used in that industry and a large part of the remainder in the manufacture of brass, bronze and other alloys. No satisfactory substitute has been found for bronze as a bearing metal.

Occurrence—Has been commercially produced in Beaverhead, Broadwater, Cascade, Deer Lodge, Fergus, Gallatin, Jefferson, Granite, Lewis and Clark, Lincoln, Madison, Meagher, Mineral, Missoula, Park, Powell, Ravalli, Sanders, and Silver Bow counties. It is the Silver Bow production that gives Montana third rank among the states on this metal.

IRON

Uses—Modern civilization is based upon the fabrication of this metal. This is the age of the machine, mostly made from steel, a product of iron.

Occurence—Three deposits of iron ore in Montana have been reported by the U. S. G. S., but there are reports of many other deposits, upon one of which—in Meagher county—considerable exploration work has been done. This deposit and the one in Cascade and Judith Basin counties which has been examined by the U. S. G. S. are the only ores in the state at present of known commercial importance.

In central Montana, on Running Wolf and Dry Wolf Creeks, 12 miles southwest of Stanford, on the Great Northern Railway, and about 54 miles southeast of Great Falls (Cascade and Judith Basin counties), is found iron ore known as the Running Wolf hematite deposits. The ore bodies range in width from five to 60 feet and average about 20 feet. On two claims at the east end of the property, the U. S. G. S. estimates there are one million gross tons of ore. The U. S. G. S. says: "The ore in places contains enough magnetite to make it react to the magnet. It is not to any large degree limonitic at the surface. At one point where a considerable depth has been reached, the ore contains a little pyrite and chalcopyrite. Mineralogically, the ores are entirely satisfactory for steel manufacture. Ore is exposed at points along the middle of the belt, but no estimate of tonnage can be attempted here. At the west end showings are better. Ore appears at intervals through a distance of nearly a mile, and the average of the thickness of the ore body in the different openings is 20 feet. The present availability of this ore depends on several factors which cannot be considered in this paper, such as the cost of transportation to central and eastern manufacturing points and the possibility of economic production of iron in the nearby Rocky Mountain region".

Extensive deposits of high grade iron are reported on Sheep Creek in the northern part of Meagher county. It is said the mineralized area extends through the Belt Mountains 50 miles, but the workable deposits are found in a circular

area of 2,500 acres. The iron content is said to range from 35 per cent in soft earth to 65 per cent in two main outcroppings of iron cliffs. Private geologists have reported from 80,000,000 to 140,000,000 tons of workable ore in sight, of which 100,000,000 tons could be recovered by means of the steam shovel. The ore body has been prospected to a depth of 40 feet without going out of ore, and geologists report the contour is such as to indicate the ore goes to a depth of 200 feet.

The U. S. G. S. reports the existence of magnetite beds over the west half of the Blackfeet Indian reservation, Glacier county, which can be traced for many miles entirely across the reservation. The principal beds are found on the South Fork of the Milk River. The beds are a number of small, widely scattered areas which contain rich magnetite sandstones reaching a thickness of nine feet, with an average thickness of four to five feet. The U. S. G. S. says a considerable tonnage of ore which would average about 50 per cent of iron could be hand sorted from the deposits. It concludes: "The proportion of titanium oxide in the ores is considerable, averaging over 12 per cent in one sample. This high titanium content renders these ores unfit for use, according to present metallurgical practice, although it must be recognized that ores of this type may eventually be successfully smelted."

On the south side of Birch Creek, about half a mile south of the Indian Queen mine, six miles west of Apex station, Beaverhead county, the U. S. G. S. reports deposits of magnetite iron ore. They occur as irregular pockets and have been opened by shallow pits and shafts to obtain fluxing material for copper or lead smelters.

Reported that Smoky Butte, 10 miles west of Jordan, Garfield county, is a mountain of high grade iron ore. Much meteoric iron found in that region and particularly near Smoky Butte. So far as known, no examination by geologists has ever been made.

In 1919, 476,461 long tons of iron ore were imported into the United States.

LEAD

Uses—As metal it is made into sheets, pipes and cable coverings and is used as constituent of industrial alloys—babbit, type metal, battery plates and bullets. In the form of carbonates and oxides great quantities used in paints, in manufacture of storage batteries, enamel, glass, pottery, rubber and varnish.

Occurrence—Has been commercially produced in Beaverhead, Broadwater, Cascade, Deer Lodge, Fergus, Jefferson, Granite, Lewis and Clark, Lincoln, Madison, Meagher, Mineral, Missoula, Park, Powell, Ravalli, Sanders and Silver Bow counties.

MANGANESE

Uses—In making steel by the open-hearth and Bessemer processes. Two alloys in common use—ferromanganese which contains 70 to 80 per cent of manganese and made from ore that carries more than 40 per cent manganese, used largely in open-hearth steel from which structural shapes, sheets, bars and wire are made; and spiegeleisen, which contains 16 to 30 per cent of manganese, used largely in making Bessemer steel, from which rails, forgings, etc., are made. In steels made for most uses none are so cheap or so effective as manganese. In glass making as a decolorizer.

Occurrence—Reported by the U. S. G. S. in eleven different places in Montana. U. S. G. S. says: "The greatest, best developed and most available domestic reserves of high-grade manganese ore are in the Philipsburg district of Montana". Of the deposits at Butte says: "The bodies of rhodochrosite at Butte . . . . . are among the largest and most valuable sources of manganese in the country". Adds Philipsburg and Butte possess several advantages that partly over-

come handicap of great distance from the principal consuming centers. The chief advantage at Philipsburg is the fact the ores are suitable, or may be readily made suitable for the manufacture of dry-cell batteries in the manufacture of which 25,000 to 50,000 tons of ore are consumed annually at a price two or three times as large as the price paid for ore of ordinary grades. The advantages at Butte are that the deposits can be developed and the ore removed without additions to the workings needed to exploit the ores of other metals, the abundant facilities available for concentrating the ore and making ferroalloys.

Deposits ranging from high to low grade are reported by U. S. G. S. in Castle district, Meagher county; Neihart, Cascade county; Wickes and Renova, Jefferson county; three miles northwest of Anceney, Gallatin county; on Trapper Creek, nine miles west of Melrose, Beaverhead county; in Dry Georgia Gulch, east of Twin Bridges, and seven miles southwest of Norris, Madison county.

Montana has ores suitable for the two alloys in common use, ferromanganese and spiegeleisen. The United States imported 33,022 long tons of ferromanganese in 1919; 27 long tons of spiegeleisen; 333,344 long tons (total imports) of manganese ore in 1919.

MOLYBDENUM

Uses—A metal of potential rather than actual use. Encouraging results reported from experiments made with a view of using small quantities molybdenum to make steels of high tensile and torsional strength and great elasticity. Also used in incandescent lamps and in X-ray tubes.

Occurrence—The U. S. G. S. says, "among the principal deposits of molybdenum ores known are . . . . . near Emigrant (Park county), and at other places in Montana" Also reported by U. S. G. S. in Potosi mining district, 14 miles southwest of Pony, Madison county. Reported two miles east of Ophir, Powell county, and also 30 miles northwest of Dillon, Beaverhead county, 10 miles west of Oregon Short Line.

In 1919, 106,743 pounds of molybdenum ore were imported.

TUNGSTEN

Uses—Constituent of steels for making high-speed tools, also as a filament for incandescent lamps. A tungsten-iron alloy used for making valves and valve stems for airplane and high-power automobile engines. Pure tungsten used in Roentgen ray tubes.

Occurrence—In the Potosi mining district, 14 miles southwest of Pony, Madison county, U. S. G. S. says, "although originally mined for silver, these ores are of interest now chiefly because they contain tungsten". No extensive development. Vein in general persistent in strike and dip, one to six feet in thickness. Tungsten occurs as hubernite in streaks one to twenty inches thick. One sample assayed 4.5 per cent tungstic acid. Reported by Winchell in form of hubernite in the Birdie and Scottish Chief mines at Butte. In form of scheelite has been mined and shipments made from Jardine district, Park county.

In 1919, 9,408 short tons of tungsten-bearing ores were imported into the United States.

URANIUM

Uses—As an alloy for making high speed tools, in gas mantles and electric lamp filaments; in salts and other forms used for iridescent glass and pottery glazes, in porcelain-painting and calico-printing, in medicine and in chemical dedeterminations. Most widely known as the chief source of radium which is extracted chiefly from the carnotite and pitchblende ores of the uranium group.

Occurrence—State School of Mines tested sample of uranium ore from Carbon county that ran about 25 per cent in radioactivity.

In 1919, 6,026,005 pounds of steel hardening ore were imported.

ZINC

Uses—More than half the domestic output used in galvanizing iron and making brass. About one-fourth used as zinc oxide in paints.

Occurrence—Has been commercially produced in Cascade, Deer Lodge, Jefferson, Granite, Lewis and Clark, Lincoln, Madison, Mineral, Ravalli, and Silver Bow counties. One-fifth of the nation's supply of zinc comes from Silver Bow, according to the U. S. G. S. and the production in that county has given Montana third rank in zinc.

MINERALS NON-METALLIC

ALABASTER

Uses—A fine-grained variety of gypsum occurring in the massive form. For small statues and other ornamental designs.

Occurrence—Large deposits reported by Rowe in the Little Snowy mountains in Fergus and Golden Valley counties.

ARSENIC

Uses—Metallic arsenic constituent of hard lead, used in shot and bearing metals. In oxide form called white arsenic in making glass, which consumes half the domestic output, and in insecticides. In other forms, constituents of sheep and cattle dips, and also used in dyeing textiles, in tanning, in medicine, and during World War in preparing poison gas.

Occurrence—Recovered as a by-product of the Butte ores in the reduction works at Anaconda. Also recovered as a by-product of gold ores in the Jardine mining district of Park county. Nearly all the world's supply is recovered as a by-product of smelting. The claim is made that Montana is (1923) producing 45 per cent of the arsenic output in the United States.

ASBESTOS

Uses—Fireproof cloth for firemen's suits, theater curtains, steam packing and other forms of heat insulation and non-conducting coverings; low-grade material constituent of various building products; in electrical industry where both insulation and resistance to high temperatures are required.

Occurrence—Reported in Gallatin county, 16 miles northwest of West Yellowstone, and also in Madison county, in Madison range east of Ennis.

BARITE

Uses—In pigments, as sizing for papers and textile fabrics, in manufacture of rubber, asbestos, cement and in tanning. Compounded with zinc sulphide used as pigment in white enamel paints, and in manufacture of linoleum and oilcloth.

Occurrence—Reported by Rowe on Pattee Creek, two miles southwest of Missoula, Missoula county; in Ruby Mountains, Madison county; on Cabin Creek, 25 miles southeast of Ekalaka, Carter county; on Cedar Creek, 25 miles from its mouth, in Wibaux county. Missoula deposit described as one of the best and purest in northwest and of commercial importance. Also reported near Stanford, Judith Basin county.

BENTONITE

Uses—Sizing for paper, absorbent in dynamite manufacture, retarder for gypsum plasters, constituent of a remedial dressing (antiphlogistine), adulterant in candies and drugs, de-inking of wood-pulp papers.

Occurrence—Reported six miles northwest of Hysham, Treasure county, in deposit five miles long and up to a mile wide, 10 to 30 feet in thickness.

BUILDING STONES

Uses—With a growing population and a rapidly decreasing timber supply, there must come an increasing use of stone and artificial building materials for

building and public works. The essential qualities of building stones are strength, durability, workability, color and beauty.

Occurrence—According to Rowe, who has made the only survey of this resource, Montana is well supplied with many varieties of good building stones. East of the Rocky Mountains the stone is mostly sandstone; in the western part of the state, granite, quartzite, limestone and phyllite are the principal kinds of rock. In a few places, especially in the western third of the state, volcanic ash is used as a building stone. Rowe states a sandstone quarry is found at almost every town from Wibaux, in eastern Montana, to Livingston, 350 miles west, while from Helena west to the Bitter Root mountains, both north and south, are found granite, phyllite, and quartzite in large quantities and at many localities.

Sandstone quarries are mentioned by Rowe in Beaverhead, Carbon, Cascade, Hill, Custer, Fergus, Sweet Grass, Stillwater, Yellowstone and Park counties. The Beaverhead, Stillwater and Yellowstone sandstones pronounced among the best in the state. Some of the best buildings in Salt Lake were constructed of Beaverhead county stone, and the softer, purer white variety has been used as a flux at Anaconda. Rowe says this softer kind is without doubt the purest quartz sandstone in the state, and when crushed resembles glass sand, for which purpose it would undoubtedly be good. The original state capital at Helena was built of Stillwater county sandstone.

Granite quarries are mentioned by Rowe in Lewis and Clark, Jefferson, Silver Bow and Ravalli counties The wings of the state capital at Helena were constructed of Jefferson county granite.

The finest colored quartzite in the state is probably found in Beaverhead county, according to Rowe, and the largest quantity in Missoula county. In Beaverhead county, he says, is found the best volcanic ash building stone in the state. Other counties named as being among the chief producers of this stone are Gallatin, Rosebud, Missoula and Ravalli. The best quarry of phyllite or silicious slate is in Flathead county. This stone is also found in Missoula county.

CLAYS

Uses—For pottery ware including porcelain, china, granite and earthenware, various kinds of brick, flooring, terra cotta in moldings and decorations, for irrigating and drain tile, water conduits, sewer pipes, ventilating flues. In the industrial arts for crucibles, retorts, furnace and stove linings, puddling hearths, smelting furnaces, glass pots, insulating materials in electrical engineering, filling for walls, sizing and filling for paper, cement manufacture, mineral paint and paint adulterants and experimentally in manufacture of aluminum. Among the most important kinds of clay are china clay, kaolin and indianaite, usually mixed with feldspar and used in whiteware, porcelain, tiles, insulators and for sizing and weighting paper. Ball clay and ware clay, a white burning plastic clay used in pottery industry to give strength and plasticity to the non-plastic clays. Fire clay, chiefly residual or sedimentary clay possessing high refractoriness, used in fire bricks, furnace linings, retorts, crucibles, tiles, terra-cotta, pressed brick, etc. Much of the fire clay produced comes from beneath coal seams. Brick clays, impure plastic clays usually with a high percentage of fluxing impurities which cause them to burn to a hard product at a low temperature. Stoneware clay, a refractory or semi-refractory vitrifying clay of sufficient tensile strength and plasticity to be workable on a potter's wheel. Fire proofing and hollow brick clay should have rather high plasticity, fair tensile strength and should burn to a good hard but not vitrified body at a comparatively low temperature. Washed kaolin and certain fine-textured, fairly plastic sedimentary clays free from sand are used to give body, weight and firmness to various kinds of paper. Cement clay

should contain 60 to 70 per cent of silica and the iron oxide and alumina together should not exceed one-half the percentage of silica.

Occurrence—The only general survey of Montana's clay resources was made by Rowe. He reports deposits of brick clay at several places in Missoula, Sanders, Flathead and Ravalli counties, in Lewis and Clark, Silver Bow, Powell, Cascade, Rosebud, Yellowstone, Gallatin, Phillips, Valley, Park, Blaine, Hill, Beaverhead, Carbon, Granite and Fergus. The U. S. G. S. reports brick clay in Sheridan county.

Rowe reports deposits of fire clay in Powell and Jefferson and at two places each in Lewis and Clark, Cascade and Flathead counties.

Pottery clay is reported in Powell, Missoula and Gallatin counties, at several places in Sanders, Flathead and Ravalli counties, beneath coal veins in Fergus county, and possibly exists in Sheridan and Carbon counties. The clay in Carbon county may contain too much pyrites for pottery purposes, and the color of the Sheridan county clay may be objectionable.

The U. S. G. S. reports bed of clay between Plentywood and Redstone, Sheridan county, known extent of which is 18 miles east and west and eight miles north and south. Bed from three to eight feet thick. U. S. Bureau of Standards tested representative samples and reports the "clay appears to be a promising one for the manufacture of common and face brick and possibly drain tile and fireproofing. The buff color developed by burning would not permit its use in the manufacture of whiteware pottery. However, the clay has properties similar to those used in the manufacture of stoneware". The U. S. G. S. points out that the presence in the area of lignite will aid greatly in the exploitation of the bed and the manufacture of clay products and the report concludes: "Though the local demand for the clay products may not be great, the association of lignite and clay, together with the advantages of location and transportation, may make the deposit valuable to the prospective manufacturer".

CORUNDUM (Industrial)

Uses—As an abrasive. Molded into wheels, whetstones, slips, hones and oil stones. Also used in powder of various degrees of fineness and made into abrading papers for polishing, stone and gem cutting and polishing, dental work, glass frosting and etching, and wood-working. In the gem form as a sapphire used for bearings in many delicate precision instruments, such as watches and various meters.

Occurrence—Reported by U. S. G. S. on headwaters of Elk Creek, 23 miles south of Belgrade, Gallatin county. Corundum-bearing rock eight to ten feet in width. Corundum crystals vary from fraction of an inch up to eight inches and have been found up to two pounds in weight. Concentrated in seams, some of the smaller ones consisting of pure corundum and the larger ones carrying 10 to 70 per cent corundum. U. S. G. S. says it is reported this deposit is a good abrasive, and a fire test proves it can be used in the manufacture of a vitrified wheel. Another deposit reported five miles west of this one, and a third deposit 14 miles southwest of Bozeman.

As a sapphire is found in gravel deposits on Rock Creek, Granite county. This deposit is being worked and practically the entire output goes into industrial uses.

CRYSTALLINE LIMESTONES AND MARBLES

High grade deposits of marble are reported from a number of places in Montana. There has been practically no commercial production, however. Near Manhattan, Gallatin county, is a deposit of travertine onyx. Rowe reports the stone is of good grade and the product similar to the Mexican variety and that it takes a splendid polish. In Nelson Gulch, southwest of Helena, Lewis

and Clark county, is reported a deposit containing seven distinct varieties of marble, Creoles, Sinias and Egyptian blacks and creams, white statuary marble, corrara marble, blue marble, and Georgia white marble. It is reported a good quality of marble is found on Dempsey Creek, Powell county. Marble deposits are reported north of Lothair, Hill county; also near Townsend, Broadwater county, near Dewey, Beaverhead county, and near Garnet, Granite county.

FLUORITE

Uses—Chiefly as a flux in manufacture of basic open hearth steel. Also as a flux in blast furnaces. Considerable quantity used in manufacture of glass and enameled ware; in electrolytic refining of antimony and lead; production of aluminum, and in manufacture of hydrofluoric acid.

Occurrence—Reported by U. S. G. S. in the Potosi mining district, 14 miles southwest of Pony, Madison county. Varies in color remarkably in this district, being purple, green, blue, white or black. Also reported near Mullan Pass, west of Skyline, Lewis and Clark county.

In 1919, 6,943 short tons of fluorite were imported into the United States.

FULLER'S EARTH.

Uses—Used for scouring and cleaning cloth and more extensively for clarifying fats, oils and greases. Extensively used in refining petroleum. Coarser grades for coarse pottery, brick, tile and pipe.

Occurrence—Reported south of Baker, Fallon county, also in Silver Bow county.

GRAPHITE

Uses—Manufacture of crucibles and other refractory products, lubricants, lead pencils, paint, foundry facings, preparation to loosen boiler scale, polish for gun powder, and in electrical work. Largest quantity used in making crucibles, which for this purpose must be of the crystalline variety, with a content of graphitic carbon exceeding 85 per cent, and free from mica, pyrite and iron oxide. Amorphous graphite, which can be made in the electric furnace, is suitable for most other uses.

Occurrence—On ridge between Van Camp Creek and Timber Gulch, near southwest end of the Ruby range, 15 miles southeast of Dillon, Beaverhead county. The U. S. G. S. says development has not proceeded far enough to prove the existence of large deposits, but the prospecting done proves that considerable graphite, all of very high grade, occurs there. In another report says this deposit of the same type as the famous crystalline deposits of Ceylon. One mine producing. Also reported by Rowe three miles from Toston, Broadwater county.

GYPSUM

Uses—Wall plaster, gypsum plaster board, tile and bricks, insulating medium, retarder in Portland cement, fertilizer, blackboard crayon, base for paints, filler for cotton and most of the finer grades of paper, as a base for mixing with Paris green and other insecticides.

Occurrence—Cascade county near Millegan, Riceville, Goodman and Kibbey, in beds 3 to 6 feet thick. Fergus county, along north side of Little Belt mountains, around the Big Snowy mountains, encircling small dome near Hanover and probably encircling other structural domes, in beds 8 to 30 feet thick. In Jefferson county near Lime Spur. Carbon county, field extending from Bridger canyon southeasterly into Wyoming. Little explored. Beds 15 to 20 feet thick. Big Horn county in the Red Valley, west of Lodge Grass Creek, three beds, 6, 60 and 50 feet thick. Madison county, two beds near Lyon, 10 to 20 feet thick. Park county, near Hunter's Hot Springs, occurs in veins 1 to 5 feet wide.

ICELAND SPAR

Uses—For optical purposes, especially in instruments for polarizing light.
Occurrence—In Sweet Grass County.

KAOLIN

Uses—Extensively used in manufacture of porcelain.
Occurrence—Reported found in Fallon county.

LIMESTONE

Uses—The most generally useful sedimentary rock. As building stones. As practically the only source of lime and indispensable in cement manufacture. As fluxing material in smelting industry. A pure limestone is extensively used in sugar-refining. A fine, compact, homogeneous limestone, which may be either a pure carbonate of lime or dolomitic, is used as lithographic stone. It is found, of a quality suitable for lithographic work, at only a few localities. Two classes are known to the trade, the "blue" or hard stone, adapted to engraving and the better grade of fine-line printing; and the "yellow" or soft stone, which is rated as somewhat inferior.

There are many different kinds of limestone. The kind most suitable for one industry may be the least adapted to another industry. For Portland cement an argillaceous (clay) limestone which contains lime, silica, and alumina, in such proportions that in the finished cement the ratio of lime to the silica, alumina and iron oxide taken together shall be not less than 1.6 to 1, or more than 2.3 to 1, is most desired. For every ton of limestone used in manufacturing industries, three tons are used as furnace flux.

Occurrence—This rock is abundant in the mountainous parts of the state. Its principal use up to the present has been as a furnace flux in the smelters and in the manufacture of lime. The increased use of stucco for plaster has reduced the market for lime and kilns in a number of districts are idle. According to Rowe there are many deposits of good limestone in the state, but most of them are too remote from the railroads to permit profitable operation.

Rowe reports limestone in Lewis and Clark, Powell, Cascade, Fergus, Carbon, Beaverhead, Silver Bow, Jefferson, Sweet Grass, Gallatin, Park and Deer Lodge counties.

MICA

Uses—Indispensable in electrical industry as insulating material, in wireless apparatus, in magnetos. Also used in stove fronts, chimneys and lamp shades and sounding boxes of phonographs. Asserted the enormous expansion of the electrical industry due in large part to the unique properties of mica. To be of value as sheet deposits must yield a rectangle at least 1½ by 2 inches, which must split readily, be free from cracks, corrugations, etc. The only commercially valuable varieties in the United States are muscovite (common) and biotite (black mica).

Occurrence—U. S. G. S. quotes report of prospect eight miles southeast of Dillon, Beaverhead county, that is said to have yielded plates 8¼ by 18¾ inches. Another prospect was reported near Barker, Cascade county, in a bed four feet thick. Also reported on Granite Creek, between Virginia City and Sheridan, Madison county. Mica said to be of good quality, clear and well grained. Also reported on property of Zonolite Mining Company, near Libby, Lincoln county.

NITRATE

Uses—Chiefly as fertilizer and in manufacture of explosives.

Occurrence—U. S. G. S. reports deposit of niter along face of cliffs of black limestone, on Camp Creek, three and one-half miles northeast of Melrose, Madison county. No explorations to determine if potash and soda nitrates are included in

the limestone back from the outcrop. Estimated would require 35 tons of rock to be treated to obtain one ton of crude salts.

OIL SHALE

Uses—Source of power, light and lubricants, and, when it is a phosphatic oil-shale, as in southern Montana, is a source of fertilizer.

Occurrence—Dillon-Dell area, Beaverhead county, richest beds of phosphatic shale, 3 feet or more in thickness, yielded 25 to 30 gallons of oil to the ton. The United States Geological Survey, in its report on this field, says scant encouragement can be given the hope that the shale of this area can be successfully exploited for its oil yield. . . . . It adds, however, that if on further investigation the merits of "Tetraphosphate," a fertilizer manufactured in Italy, are established, "the process could readily be carried on in conjunction with the distillation of the oil shales in the Dillon-Dell area.

Oil shale is also found near Adel, Meagher county, yielding 12 gallons to the ton, in Jefferson county, between Jefferson station and Logan, yielding 10 gallons to the ton, in Gallatin county, near Chestnut, yielding 12 gallons to the ton. Reported by Rowe beneath gypsum bed eight miles south and east of Bridger, Carbon county.

PHOSPHATE

Uses—In largest quantity as ingredient of artificial fertilizers, finely ground, directly as a fertilizer, also used for making phosphoric acid and phosphorus. Phosphorous used in phosphor bronze, phosphor copper and phosphor tin, in incendiary bullets, smoke screens, matches, and striking surface on boxes of safety matches.

Occurrence—Reported by the U. S G. S. in Granite, Powell, Lewis and Clark, Beaverhead and Jefferson counties. Detailed reports have been made on all of these deposits except the one near Cardwell, in Jefferson county. They show the deposits examined are workable and high grade, containing 60 per cent or more tricalcium phosphate. The deposits are easily accessible from Maxville, Garrison, Elliston and Melrose, at a distance of one to six miles from the railway. The Montana deposits, with those found in Idaho, Utah and Wyoming, constitute the largest phosphate beds in the world, so far as known. They are of a higher grade than those found in Florida and South Carolina which have been the principal source of phosphate in this country up to the present time. The U. S. G. S. estimates there are nearly six billion tons of high grade phosphate available in the United States of which five and a half billion tons are found in Montana, Idaho, Utah and Wyoming.

Some development work has been done on the Granite county deposits but they have not reached the commercial stage. The Anaconda Copper Mining Company has been using phosphate rock from Conda, Idaho, in a superphosphate plant at Anaconda, the capacity of which is being enlarged (1923) from 10,000 tons to 30,000 tons of superphosphates per year. The enlarged plant will use 70,000 tons of sulphuric acid which is the capacity production of the acid plant at the Anaconda Reduction Works.

SLATE

Uses—About three-fourths of the slate produced in this country is for roofing purposes. Mill stock includes blackboards, flooring, wainscoting, mantels, hearths, switchboards, vats, sinks, laundry tubs, sanitary ware, grave vaults, tops for laboratory, billiard and kitchen tables. Waste is used for road material and flagging. Slate veneer, a built-up material, recommended for roofing.

Occurrence—Four miles east of Mitchell, Lewis and Clark county. Some development has been done on this deposit and machinery installed for making shingles, blackboards, switchboards, table tops and other flat work. The black-

boards at the Montana Wesleyan College, Helena, were made here. It is said electrical appliance companies and billiard top concerns that have tested this slate report it is very high grade and particularly suitable for switchboards and billiard tops.

SOAPSTONE

Uses—The most generally known use is in hot-cake griddles. An ingredient of some lubricants, and utilized in a variety of other ways.

Occurrence—Reported by Rowe in a coal mine four miles southeast of Gilt Edge, Fergus county, and in a coal mine seven miles from Forsyth, on Smith Creek, Rosebud county. Bed four feet in thickness reported by U. S. G. S. in coal mine at Aldridge, Park county.

SULPHUR

Uses—In making sulphuric acid and paper pulp, as a fungicide or insecticide in agriculture, and in certain explosive powders. More than half the total production converted into sulphuric acid which is used in fertilizers in refining petroleum, in pickling and galvanizing steel, and in making chemicals and drugs.

Occurrence—As a by-product from the smelters in Deer Lodge and Lewis and Clark counties.

FORESTRY RESOURCES

LUMBER AND TIMBER

Uses—The first material used by primitive man for shelter, fuel and utensils. While in many lines other materials have been substituted, it is still indispensable to many industries. The list of by-products steadily grows and their uses multiply. Used in the building, transportation and extractive industries, and in a wide variety of manufactured articles, from furniture to farm machinery. In form of wood pulp is the chief source of most of the paper used, and in form of pressed fiber has found many uses as substitute for metal. Experimentally, animal food products have been manufactured from it.

Occurrence—The estimated timber stand of Montana is 59,509 million feet, of which 39,708 million feet are under federal control, 17,501 million feet under private control, and 2,300 million feet under state control. The estimated stand by species is as follows: Lodgepole pine, 14,599 million feet; Douglas fir, 7,366 million feet; Western larch, 4,364 million feet; Western yellow pine, 3,427 million feet; Engelmann spruce, 2,749 million feet; miscellaneous, 1,188 million feet; Western white pine, 630 million feet; White bark pine, 416 million feet; Alpine and white fir, 396 million feet; Cedar, 115 million feet; making a total of 35,250 million feet.

In production of lumber the leading counties in 1921 ranked in the following order: Missoula, Flathead, Lincoln, Ravalli, Sanders, Granite, Powell, and Gallatin. Other counties producing lumber are: Beaverhead, Big Horn, Blaine, Broadwater, Carbon, Carter, Cascade, Deer Lodge, Fergus, Golden Valley, Granite, Jefferson, Judith Basin, Lewis and Clark, Madison, Meagher, Mineral, Musselshell, Park, Phillips, Powder River, Rosebud, Stillwater, Silver Bow, Sweet Grass, Teton, Treasure, Wheatland and Yellowstone.

FARM, RANGE AND FOREST PRODUCTION IN MONTANA*

Year	Total Crop Acreage	Total Crop Farm Value	Wool Production (Lbs.)	Cattle Shipments No. of Head	Lumber Cut (Feet)
1909	1,828,000°	$ 25,616,000°°	35,000,000	255,178	308,582,000
1910	2,379,000°	33,357,000°°	33,600,000	243,662	319,089,000
1911	2,803,000°	43,415,000°°	34,875,000	205,873	228,416,000
1912	3,482,000°	42,361,000°°	31,175,000	188,675	272,174,000
1913	3,726,000°	46,407,000°°	31,500,000	172,299	357,974,000
1914	4,055,000°	63,101,000	30,177,000	158,623	317,842,000
1915	5,012,000°	74,116,000	26,950,000	173,936	328,000,000
1916	5,287,000°	115,097,000	24,570,000	227,828	383,900,000
1917	5,972,000°	98,293,000	23,342,000	333,056	350,000,000
1918	6,592,000°	137,369,000	18,685,000	406,415	340,000,000
1919	7,472,400	69,975,000	18,267,000	641,337	287,378,000
1920	6,702,000	96,674,000	16,000,000	211,242	410,000,000
1921	6,400,000	75,010,000	16,400,000	147,413	213,857,000
1922	6,872,000	92,932,090	16,700,000	246,378	304,377,000

*Detailed information is available in The Montana Farm Review, which will be sent upon application to the Department of Agriculture, Helena, Mont.

°The figures from 1909 to 1918 inclusive only include the principal crops.

°°Figures for 1909 to 1913 inclusive include the acreage but not the farm value of wild hay.

MINERAL PRODUCTION IN MONTANA IN 1919 AND 1920

(U. S. Geological Survey)

PRODUCT	1919		1920	
	Quantity	Value	Quantity	Value
Cement, barrels	(a)	(a)	(a)	(a)
Clay products		$ 394,899		$ 407,984
Clay, raw, short tons	5,077	b 30,551	2,582	b 15,614
Coal, short tons	3,236,369	8,644,344	4,413,866	13,923,000
Copper, pounds	169,981,288	31,616,520	177,059,260	32,578,904
Ferroalloys, long tons	(a-b)	(a-b)	(a-b)	(a-b)
Gems and precious stones		48,391		223,196
Gold, troy ounces	107,856	2,229,588	89,550	1,851,165
Graphite, crystalline, pounds			(a)	(a)
Gypsum, short tons	(a)	(a)	(a)	(a)
Iron ore, long tons	3,438	(a)	10,803	73,889
Lead, short tons	17,219	1,825,201	15,627	2,500,313
Lime, short tons	3,340	35,834	2,638	30,020
Manganese ore, long tons	24,993	993,633	76,441	1,966,881
Mineral waters, gallons sold	499,225	6,811	(a)	(a)
Natural gas, M cubic feet	857,958	85,800	817,730	88,100
Petroleum, barrels	90,000	171,000	340,000	1,045,000
Sand and gravel, short tons	159,564	71,736	248,260	73,986
Silica (quartz), short tons	(a)	(a)		
Silver, troy ounces	12,541,181	14,046,123	12,579,178	13,711,304
Stone, short tons	209,140	183,703	275,150	296,019
Sulphuric acid (c), short tons			(a)	(a)
Zinc, short tons	84,382	12,319,759	92,169	14,931,361
Miscellaneous		1,030,066		3,435,685
Total value, eliminating duplications		$73,630,824		$85,885,503

a—Value included under "Miscellaneous."

b—Value not included in total value for state.

c—From copper smelting.

MINERAL PRODUCTION IN MONTANA

(U. S. Geological Survey Figures)

Year	Gold	Silver	Copper	Lead	Coal	Zinc	Value of Precious Stones	Manganese	Petroleum	Gas	Rank of State in Val. of Mineral Production	Total* Value
	Fine ozs.	Fine ozs.	Pounds	Short Tons	Tons	Short Tons		Long tons Contains 35% or more	Barrels	Cu. Ft.		
1900	227,266	14,195,400	270,738,489	8,022	1,661,775	.....	.....	.....	.....	.....	....	.....
1901	229,495	13,131,700	229,870,415	5,791	1,396,081	.....	.....	.....	.....	.....	....	.....
1902	211,571	13,243,800	288,903,820	4,438	1,560,823	.....	.....	.....	.....	.....	....	.....
1903	213,425	12,642,300	272,555,854	3,303	1,488,810	.....	.....	.....	.....	.....	....	.....
1904	206,419	12,817,285	298,314,804	3,635	1,358,919	.....	.....	.....	.....	.....	....	.....
1905	231,913	13,231,300	314,750,582	2,207	1,643,832	.....	.....	.....	.....	.....	....	.....
1906	216,168	11,980,705	294,701,262	2,485	1,829,921	1,415	.....	.....	.....	.....	....	$ 65,501,049
1907	167,987	11,129,600	224,263,789	2,145	2,016,857	122	$229,800	.....	.....	.....	....	74,126,567
1908	152,865	10,356,200	252,503,651	2,320	1,920,190	820	58,397	.....	.....	.....	....	60,663,511
1909	181,411	12,034,500	314,900,279	1,451	3,756,530	4,680	44,998	.....	.....	.....	....	46,803,841
1910	179,975	12,282,900	283,078,516	1,943	2,920,970	15,819	57,923	.....	.....	.....	....	57,492,806
1911	179,499	11,985,196	271,816,098	2,484	2,976,358	21,905	221,613	.....	.....	.....	9	54,388,119
1912	175,371	12,731,638	308,794,483	2,517	3,048,495	13,459	200,585	.....	.....	.....	7	53,498,194
1913	168,994	13,819,201	285,724,467	3,256	3,240,973	44,337	244,935	.....	.....	.....	7	71,620,873
1914	199,203	12,536,700	236,805,845	4,386	2,805,173	55,790	67,452	.....	.....	.....	10	69,307,056
1915	242,077	14,423,173	268,263,040	4,853	2,789,755	93,573	105,355	.....	.....	.....	9	54,244,889
1916	220,130	16,494,366	352,139,768	4,961	3,632,527	114,630	108,263	6,418	44,917	.....	8	89,147,138
1917	170,147	13,128,142	276,225,977	5,933	4,226,689	93,130	59,130	61,109	99,399	334,421	7	142,650,179
1918	158,704	16,378,263	326,426,761	18,568	4,532,505	104,624	47,753	199,932	69,323	177,039	10	123,733,415
1919	119,085	12,541,181	169,981,288	17,219	3,236,000	84,382	48,391	24,993	89,000	858,000,000	11	139,331,507
1920	91,862	12,579,178	177,059,260	15,627	4,413,866	92,169	223,196	76,441	336,000	817,733,000	....	73,630,824
1921	71,632	6,558,713	48,098,730	10,183	2,733,958	11,638	489,621	11,129	1,509,000	336,000	....	85,885,503
1922	80,145	12,468,151	165,754,442	14,883	†	59,534	†	†	2,369,000	†	....	30,161,734
												‡59,500,000

*Other minerals whose values are included in the totals, but whose production is not given separately are clay products, cement, graphite, gypsum, iron ore, lime, mineral waters, sand gravel, silica, stone, sulphuric acid, and some miscellaneous minerals.

†Figures not available.

‡Estimate of U. S. Geological Survey and not final.

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